JOHNSON CONTROLS

GX-9100 Software Configuration Tool for Windows

General Setup Instructions Page 3

- *Introduction* *3
- *System Requirements* *5
- *Software Installation* *5
- *Program Start* 7
- *Connection to the DX-9100* *7
- *Connection to the DX LCD Display* *9

Creating a Configuration 11

- *Configuration Process* *11
- *Starting the GX-9100* *12
- *Defining Job Information* *23
- *Defining the Global Data* *24
- *Defining Analog Inputs and Digital Outputs* *25
- *Defining Analog Outputs and Digital Inputs* 27
- *Defining Modules* *29
- *Defining Programmable Modules* *40
- *Defining Network Modules (DX Version 3.x Only)* *43
- *Defining PLC Modules* *48
- *Connecting and Disconnecting Modules Creating a Configuration* *57
- *Defining the Trend Log Module (for DX Versions 1.4, 2.4, 3.4, or Later)* *66
- *Saving the Configuration* *73
- *Downloading to a DX Controller* *74

* Indicates those sections where changes have occurred since the last printing.

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- *Viewing Configurations* **Page** **75*
- *Printing Configurations* **78*
- *Creating Tag Name ASCII Files* *83*
- *Creating DDL Files* **85*

Modifying Configurations **87**

- *Uploading a Configuration from the Controller* **87*
- *Opening a Configuration File* **88*
- *Modifying Inputs and Outputs* **89*
- *Deleting Modules* *90*
- *Modifying Modules* **90*
- *Modifying Connections* **92*
- *Calibrating Analog Inputs and Outputs* *92*

Configuring the DX LCD Display ***95**

Importing DOS GX-9100 Files ***97**

Commissioning **99**

Troubleshooting **101**

- *Note on Ranges* *101*
- *Common Error Messages* **101*

Appendix 1: Source Points ***103**

Appendix 2: Destination Points **109**

Appendix 3: Trend Log Items ***113**

Appendix 4: DX LCD Display Data Points ***115**

Appendix 5: Item Abbreviations ***117**

Appendix 6: Comparison with the DOS Version ***119**

Appendix 7: Custom Home Page Syntax ***121**

* Indicates those sections where changes have occurred since the last printing.

General Setup Instructions

Introduction

In this document, Facility Management System (FMS) is a generic term that refers to the Metasys® Network, Companion™, and Facilitator™ supervisory systems. The specific system names are used when referring to system-specific applications.

GX-9100 Graphic Configuration Software is used to configure the DX-9100 Extended Digital Plant Controller, the XT-9100 and XTM-905 Extension modules (XTM-905 is not available in North America as of May, 1999), and the DX LCD Display. This manual assumes that the reader is familiar with the DX-9100, XT-9100, XTM-905, and DX LCD Display. The GX-9100 software runs on an IBM®, or 100% compatible computer with a minimum of 4 Mb memory and a 486 processor.

The DX-9100 processes the analog and digital input signals it receives, using 12 multi-purpose programmable function modules, a software-implemented Programmable Logic Controller (PLC), time schedule modules, and optimal start/stop modules. It uses these components, as needed, to produce the required outputs, depending on the module configuration, operating parameters, and programmed logic.

The DX-9100 can accept eight analog inputs and eight digital inputs. It provides up to 14 output modules, which are configured to give 8 analog outputs (2 analog outputs in the Version 1 controller) and 6 digital outputs (triacs). The triacs can be separately configured to provide six on/off or pulse outputs, six duration adjust outputs, 3-position adjust (incremental) outputs, three start/stop outputs, or any combination using up to six triacs.

The DX-9100 input/output can be extended by up to 64 remote inputs/outputs, analog or digital, depending on the type of the connected XT-9100 or XTM-905 extension module configurations (XTM-905 is not available in North America as of May, 1999).

Each XTM-905 with an XP module can provide either eight analog points or eight digital points (XTM-905 is not available in North America as of May, 1999). An XT/XTM can be expanded to provide eight additional digital points in one physical configuration by connecting two to four XP modules to the XT/XTM module.

The Version 3.x controller (LONWORKS® DX-9120) can receive and transmit analog and digital data over the network to other Version 3.x controllers. Each controller accommodates 16 network analog inputs, 16 network analog outputs, 8 blocks of 16 digital inputs, and 8 blocks of 16 digital outputs. Network inputs and outputs allow DX-9120 controllers to share data on a LONWORKS N2 trunk without the need for a supervisory controller.

A configuration comprises a set of parameters for each module, which are stored in a series of memory locations in the controller. Through the GX-9100 software, each module is assigned a type, details are entered in its data window, and outputs (source points) are connected to the inputs (destination points) of other modules. The PLC requires the generation of a logic diagram using different types of logic instructions. Finally, all the information is downloaded to the controller. Information uploaded from the controller may also be displayed via the GX-9100 program.

The DX LCD Display unit is configured to display up to 96 data points from the DX controller configuration. It also displays alarm data, time schedules, trend logs, and a user-defined graphics screen. The GX-9100 is used to select data points for display and to define user text for all its various screens.

Finally, all the data is downloaded to the controller and the DX LCD Display unit.

Related Information

Refer to Table 1 for additional information:

Table 1: Related Information

Document Title	Code Number	FAN
DX LCD Display Technical Bulletin	*LIT-6364120* *LIT-16284120*	*636.4* *1628.4*
GX-9100 for Windows Addendum, Configuring the DX LCD Display User's Guide	*LIT-6364065* *LIT-1628465*	*636.4* *1628.4*
DX-9100 Configuration Guide	*LIT-6364030*	*636.4* *1628.4*
DX Commissioning Using the Point Template Program User's Guide	*LIT-6364080* *LIT-1628480*	*636.4* *1628.4*
LONWORKS N2 Bus Technical Bulletin	*LIT-6364100*	*636.4*
XTM-105 Extension Module, XPx-xxx Expansion Modules Technical Bulletin*	*LIT-6364200*	*636.4*

*(XTM-905 is not available in North America as of May, 1999.)

System Requirements

The following system components are needed to run the Microsoft® Windows® version of the GX-9100 Graphic Configuration Software:

- IBM AT, PS/2®, or 100% compatible computer
- minimum of a 486 processor
- minimum of 4.0 Mb of RAM, with Windows running
- minimum of 5.0 Mb of hard disk space
- a 1.44 Mb floppy disk drive or CD-ROM (for installation)
- MS DOS, Version 5.0 or later
- Microsoft Windows, Version 3.1 or later
- RS-232 port (for downloading to or uploading from the controller)
- RS-232 cable with null modem adaptor
- printer for graphics and text
- Windows compatible mouse

Software Installation

Refer to the *Configuration Tools Software Installation Instructions Technical Bulletin*, in the *Software Installation* section of the *HVAC PRO for Windows User's Manual, FAN 637.5* or *1637.5* for instructions to install the GX-9100 software.

The installation procedure will automatically create or modify an initialization file, named `GX9100.INI`. It will also set up the program group, called *Configuration Tools,* and the icons needed for running the GX-9100 utilities, which are listed in the following table. An icon for the GX-9100 readme file is also created.

Table 2: GX-9100 Utilities

Icon	Description	Document (All in *FAN 636.4* and *1628.4*))
GX-9100	Configure the DX-9100 Controller and the XT/XTM-905 Extension Module and XT-9100 DX LCD Display (XTM-905 is not available in North America as of May, 1999).	*GX-9100 Software Configuration Tool for Windows User's Guide*
DX Commissioning	Point Template program, to commission the DX-9100 Controller, including: obtain controller information, monitor points and control loops, override and adjust points.	*DX Commissioning Using the Point Template Program User's Guide*
NDM Configuration	Create configuration files for the N2 Dialer Module (NDM), and related procedures.	*NDM Configurator Application Note*

Switching Languages/ Defaults

The installed language file set determines the default temperature units, frequency, and language. To switch languages and program defaults without having to reinstall the GX-9100 program:

1. Copy the file GXRES.* to GXRES.DDL.
2. Copy the file DXMISC.* to DXMISC.LNG.
3. Copy the file DXTEXT.* to DXTEXT.LNG.

Note: The * indicates the file extension that is the first three letters of the language/defaults you are switching to.

Enabling Password Protection for the DX-9100 Download/ Upload Dialogs (DX Version 1.4, 2.4, or 3.4)

To enable the download/upload password protection feature in the GX-9100, use a standard text editor, such as Windows Notepad, to add the following entry in the [Settings] section of the `GX9100.INI` file (located in the Windows directory):

```
[Settings]
PasswordEnable=Yes
```

If the entry is not present in the `GX9100.INI` file, then the password protection feature is disabled by default, and the DX Password fields are not shown in the Download and Upload dialog boxes.

Note: If the [Settings] section is not present, add it also, using square brackets as shown above.

Changing the Default Controller Version

To change the controller version that is chosen by default in the GX-9100 program, use a standard text editor, such as Windows Notepad, to add or change the following entry in the [Settings] section of the `GX9100.INI` file (located in the Windows directory):

```
[Settings]
DefaultControllerVersion=<version number>
```

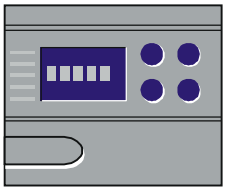
Valid entries for the <version number> parameter are:
1.1, 1.2, 1.3, 1.4, 2.0, 2.1, 2.2, 2.4, 3.0, 3.1, 3.2, and 3.4

If the <version number> variable is set to any value other than those listed above, or if the entry is not present in the `GX9100.INI` file, then the GX Tool defaults to Version 2.2.

Note: If the [Settings] section is not present, add it also, using brackets as shown above.

Program Start

To call up the GX-9100 program, start Windows, then double click on the GX-9100 icon (Figure 1) in your Configuration Tools Program Group.



GX9100 gxicon

Figure 1: GX-9100 Program Manager Icon

Connection to the DX-9100

There are two methods of connecting the computer to the DX-9100. For more information, refer to the *Controller Access Technical Bulletin* in the *Programming and Commissioning* section of this manual (*FAN 636.4* or *1628.4*).

Local Access connection from the computer to the DX-9100, Version 1 or 2, is made via an IU-9100 or MM-CVT101 converter unit that, in turn, must be connected to drive the N2 Bus (Bus 91) on which the DX-9100 controller resides.

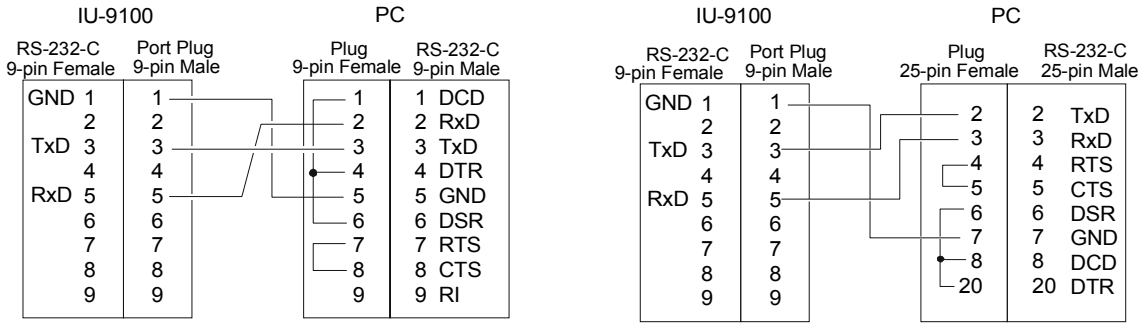
Note: The controller must be disconnected from the supervisory system.

With this configuration, each DX-9100, with its connected XT-9100 and XTM-905 modules (XTM-905 is not available in North America as of May, 1999) and any XT-9100 modules on the bus, can be downloaded one after the other, entering the appropriate controller address at the GX-9100 PC (Personal Computer). Use a standard cable with a null modem adaptor or a null modem cable to connect to the modules.

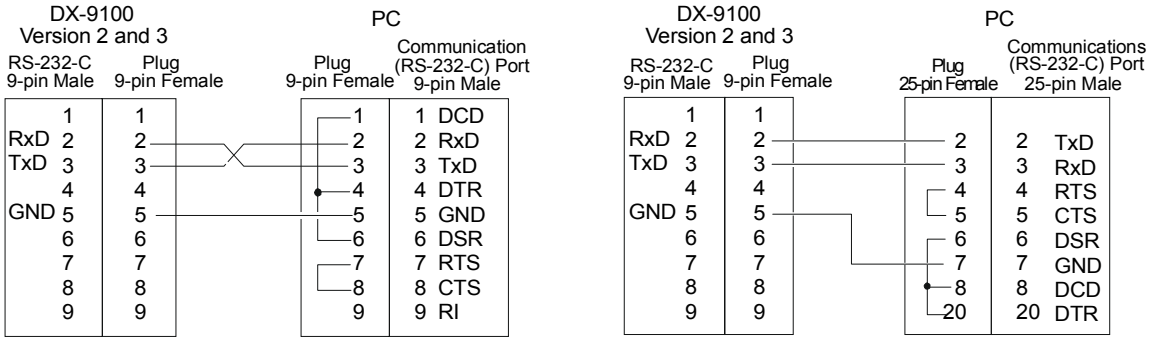
The DX-9100 Version 2 or 3 controller with its connected XT-9100 and XTM-905 modules (XTM-905 is not available in North America as of May, 1999) may be downloaded directly via its RS-232 port. With this connection configuration, only this one DX-9100 and its XT/XTMs can be downloaded.

Note: If you have a LONWORKS DX (Version 3.x), you cannot download via the LONWORKS trunk from the GX Tool. The only way is via the RS-232 port on the DX-9120 controller or through a Metasys Operator Workstation (OWS).

A) IU-9100 to PC Connection Details



B) DX Version 2 and 3 -- Direct Download



C) N2 Bus Download

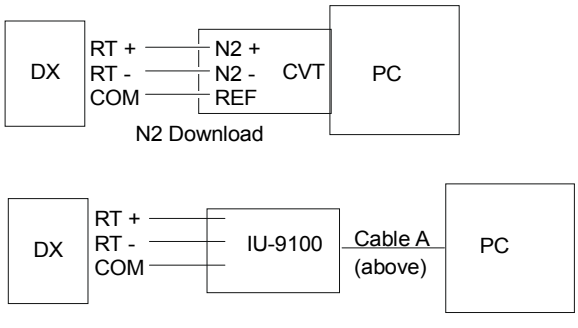


fig1

Figure 2: Connection Details for Download

Connection to the DX LCD Display

The serial cable provided with the DX LCD Display unit is used for downloading the display configuration. Connect the 9-pin female plug, normally connected to the DX controller, to the COM1 or COM2 serial port of the PC (Figure 3).

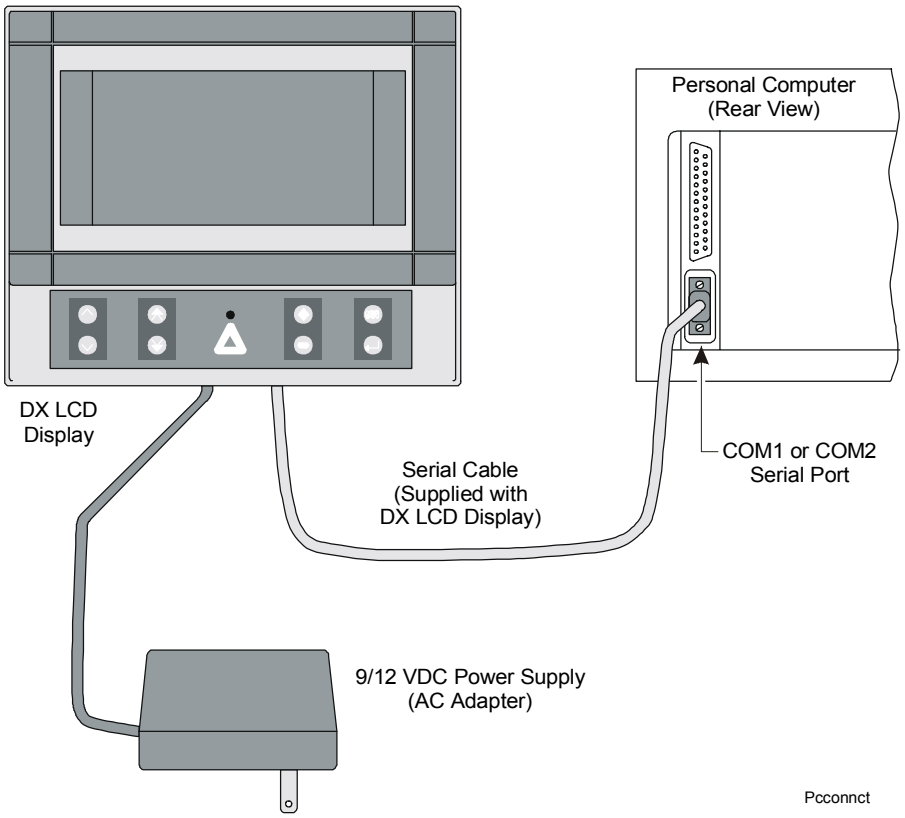


Figure 3: Connecting the DX LCD Display to the PC's Serial Port

Creating a Configuration

Configuration Process

The process for configuring a DX controller is shown in the figure below.

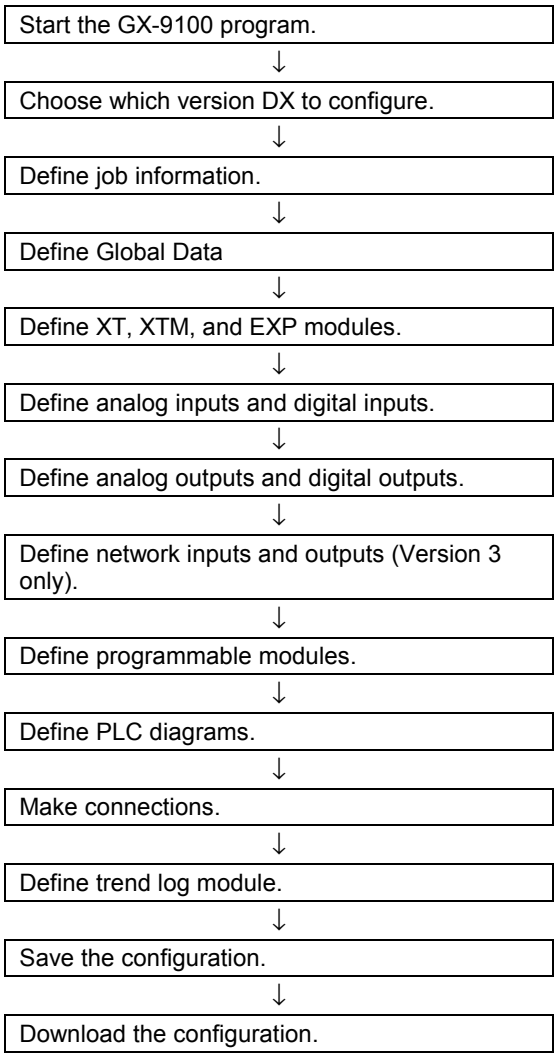

Start the GX-9100 program.
Choose which version DX to configure.
Define job information.
Define Global Data
Define XT, XTM, and EXP modules.
Define analog inputs and digital inputs.
Define analog outputs and digital outputs.
Define network inputs and outputs (Version 3 only).
Define programmable modules.
Define PLC diagrams.
Make connections.
Define trend log module.
Save the configuration.
Download the configuration.

Figure 4: DX Configuration Process

Starting the GX-9100

When you start the GX-9100 Graphic Configuration Software by double-clicking on the icon in the Program Manager, Figure 5 appears for DX Version 2.x or 3.x, Figure 6 appears for Version 3.x.

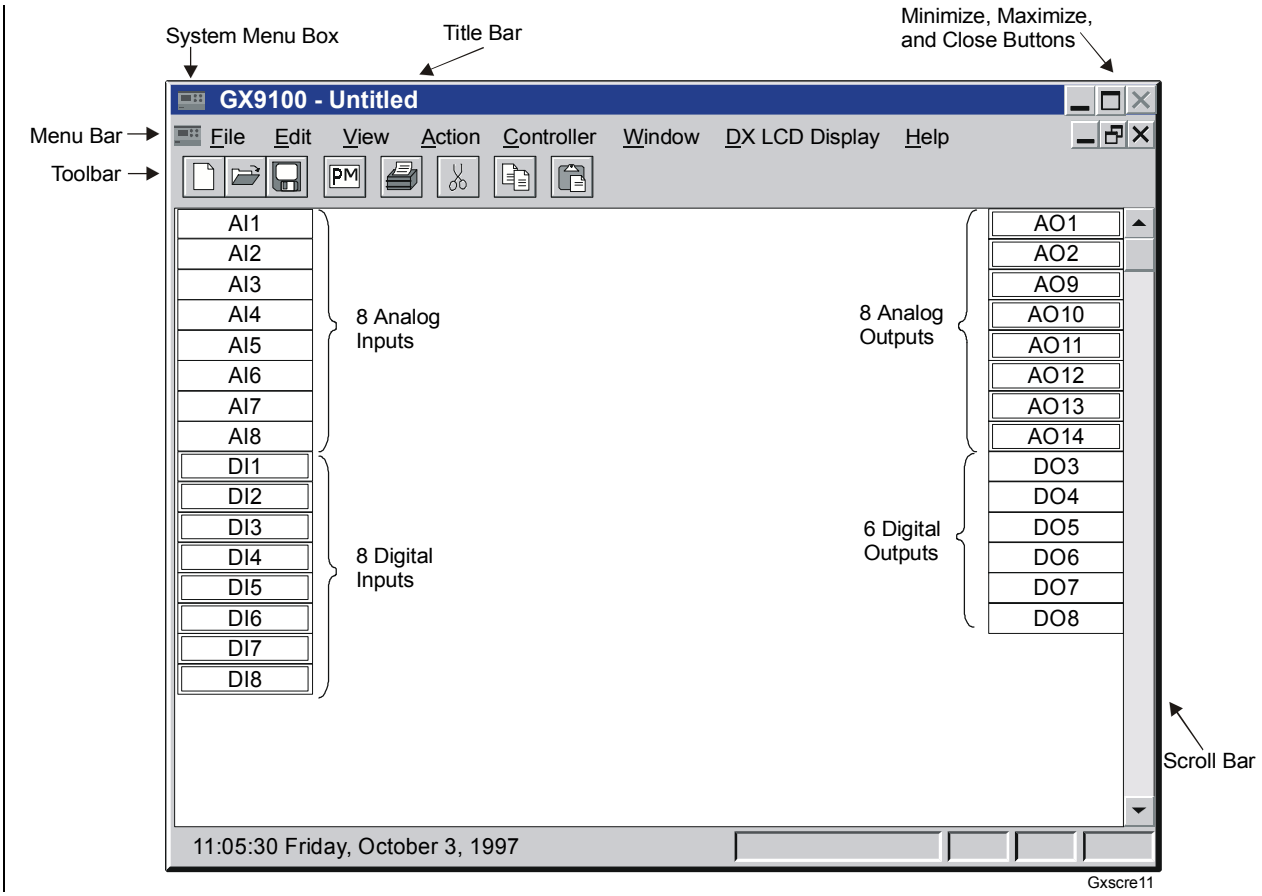


Figure 5: Main Screen for a DX Version 2.x

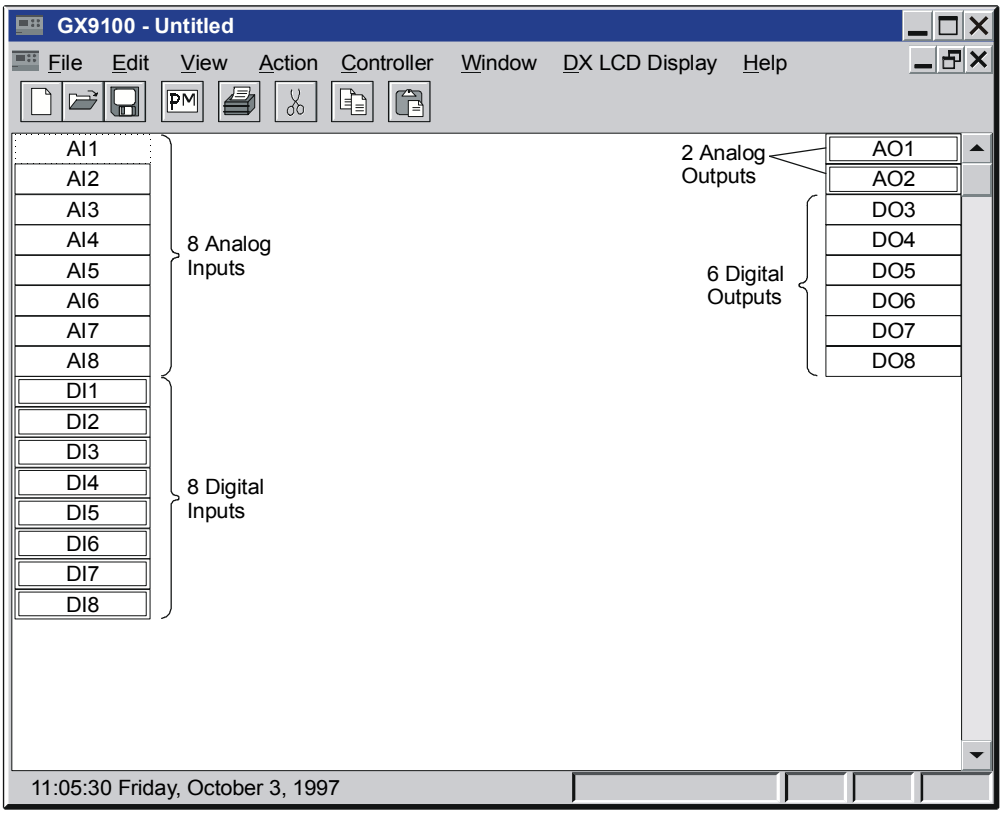


Figure 6: Main Screen for a DX, Version 1.x (Not Available in North America)

Menu Bar

The menu bar is across the top of the main screen. Clicking on these menu items with the left mouse button displays a list of options you can choose from. The menu bar, shown below, groups the activities associated with configuration into eight categories.

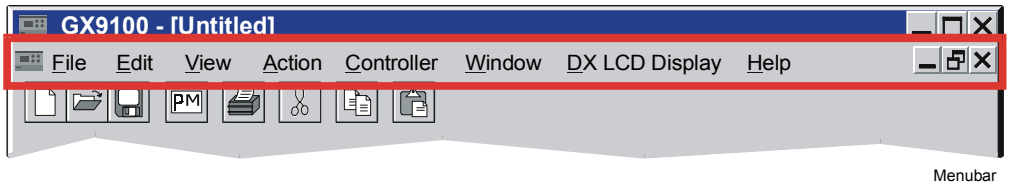


Figure 7: Menu Bar

Available options display in black text. Options that cannot be chosen are grayed-out. To choose an option, click on it once with the left mouse button. To leave the menu without choosing an option, click the left mouse button once anywhere on the screen outside of the menu. Following is a detailed description of the items in each menu.

File

The file menu, shown in Figure 8, contains options that allow you to open, save, and print configuration files.

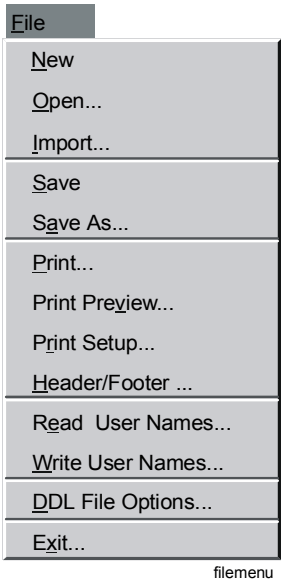


Figure 8: File Menu

The following table describes the various file menu options.

Table 3: File Menu Options

Menu Option	Description
New	Opens a new configuration file.
Open	Opens an existing configuration file.
Import	Imports files generated by the DOS GX-9100, Version 2, configuration tool into the GX-9100 configuration tool for Windows.
Save	Saves the current configuration.
Save As	Saves a copy of the current configuration under a different name.
Print	Prints the current configuration.
Print Preview	Allows you to view the current configuration as it will be printed on the page.
Print Setup	Allows you to set print parameters, including default printer, portrait or landscape, paper size and source, and page range.
Header/Footer	Allows you to set up user-defined headers and footers.
Read User Names	Reads the contents of an existing Tag name ASCII file into a GX-9100 configuration and modifies the configuration Tag names.
Write User Names	Creates a Tag name ASCII file from an existing GX-9100 configuration and saves it to disk.
DDL File Options	Allows you to define the items to be written to the DDL files when the configuration is saved.
Exit	Terminates the GX-9100 configuration tool.

Edit Menu

The Edit menu, shown in Figure 9, contains various options that allow you to create and change configurations.

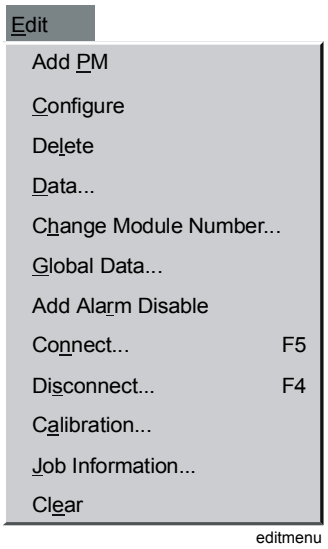


Figure 9: Edit Menu

The following table describes the various Edit menu options.

Table 4: Edit Menu Options

Menu Option	Description
Add PM	Brings up a submenu to add one of several types of programmable modules to the configuration.
Configure	Brings up a submenu that allows you to configure the highlighted module.
Delete	Deletes the current module.
Data	Brings up a data screen with information about the selected module that can be viewed and edited.
Change Module Number	Allows you to change the number of the highlighted module.
Global Data	Allows you to edit information that affects the whole configuration, including temperature units, frequency, initialization on power up, counter type, daylight saving start and end date, password, and user configuration code.
Add Alarm Disable	Adds an alarm disable function block to the configuration.
Connect	Connects source and destination points.
Disconnect	Disconnects previously made connections.
Calibration	Allows you to calibrate analog input and outputs, and trim the accuracy of the realtime clock.
Job Information	Allows you to enter information pertaining to the configuration, such as job name, controller name, engineer, and branch.
Clear	Erases all logic blocks from the PLC ladder diagram.

View Menu

The View menu, shown in Figure 10, contains various options that allow you to alter the way the configuration looks on the screen.

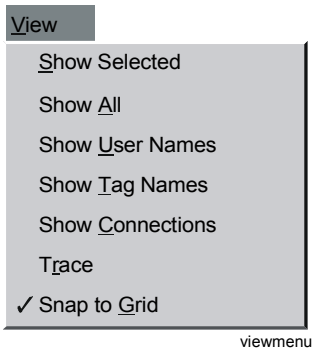


Figure 10: View Menu

The following table describes the various View menu options.

Table 5: View Menu Options

Menu Option	Description
Show Selected	Change the view to only show the modules that are currently selected and the connections between these modules. (To select more than one module at a time, press Ctrl while clicking on each.)
Show All	Returns the view to show every module in the configuration.
Show User Names	Displays the user-defined names for all modules that have them.
Show Tag Names	Displays the predefined tag names for all modules.
Show Connections	Shows all connections for the currently selected module.
Trace	Creates a graphical trace of all modules connected to a selected module for easy tracing of a path, without showing lines to and from other modules.
Snap to Grid	Allows snapping boxes to a grid, permitting easier alignment.

Action Menu

The Action menu, shown in Figure 11, allows you to upload and download configurations to and from the DX controller.

Figure 11: Action Menu

The following table describes the various Action menu options.

Table 6: Action Menu Options

Menu Option	Description
Upload	Uploads a configuration from a DX controller.
Download	Downloads a configuration to a DX controller.

Controller Menu

The Controller menu, shown in Figure 12, allows you to choose the controller for which you are creating a configuration.

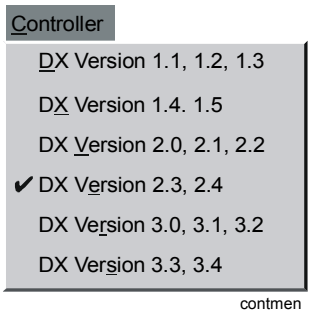


Figure 12: Controller Menu

The following table describes the various Controller menu options.

Table 7: Controller Menu Options

Menu Option	Description
Each option on the Controller menu sets up the initial screen to create a configuration for the indicated controller versions, as follows:	
DX Version 1.1, 1.2, 1.3	Versions 1.1, 1.2, and 1.3 of the DX controller.
DX Version 1.4, 1.5	Version 1.4 of the DX controller (supports Trend).
DX Version 2.0, 2.1, 2.2	Versions 2.0, 2.1, and 2.2 of the DX controller.
DX Version 2.3, 2.4	Version 2.4 of the DX controller (supports Trend).
DX Version 3.0, 3.1, 3.2	Versions 3.0, 3.1, and 3.2 of the DX controller.
DX Version 3.3, 3.4	Version 3.4 of the DX controller (supports Trend).

Window Menu

The Window menu, shown in Figure 13, allows you to cascade, tile, or arrange multiple configuration windows on the screen.

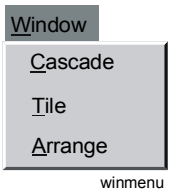


Figure 13: Window Menu

The following table describes the various Window menu options.

Table 8: Window Menu Options

Menu Option	Description
Cascade	Arranges multiple configurations on the screen in overlapping stair-stepped panes.
Tile	Arranges multiple configurations into equal-sized panes that fill the screen but do not overlap.
Arrange	Arranges icons and windows on the screen.

DX LCD Display Menu

The DX LCD Display menu (Figure 14) contains all the options required to define a configuration for the DX LCD Display.

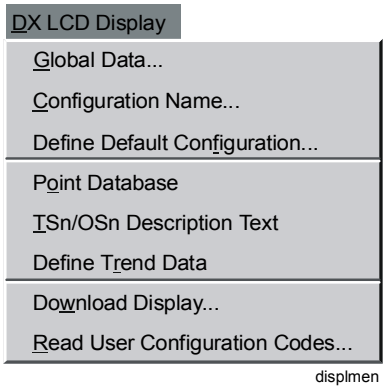


Figure 14: DX LCD Display Menu

Table 9 below describes the DX LCD Display menu options:

Table 9: DX LCD Display Menu Options

Menu Option	Description
Global Data	Edits global data that affects the operation of the display as a whole, such as the time-out period of the LCD backlight. Note: The user configuration code must be filled in or the DX LCD Display will not take a download.
Configuration Name	Edits the Configuration Name that is displayed when connected to a DX.
Define Default Configuration	Defines a default configuration to be used by the DX LCD Display in the event that none of the configurations stored in the unit matches the DX controller configuration.
Point Database	Opens a new window that allows you to define the points that are to be shown on the LCD display.
TSn/OSn Description Text	Opens a new window that allows you to edit the descriptions for Time Schedule modules and Optimal Start/Stop modules.
Define Trend Data	Opens a new window that allows you to define the points for which Trend Data is to be shown on the DX LCD display.
Download Display	Downloads the current configuration to the display unit.
Read User Configuration Codes	Reads the configuration codes and names of all of the configurations currently stored in the DX LCD Display unit.

Help Menu

The Help menu (Figure 15) allows you to view the copyright screen.

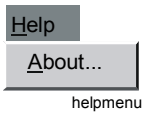


Figure 15: Help Menu

The following table describes the Help menu option.

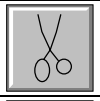
Table 10: Help Menu Options

Menu Option	Description
About	Displays copyright and version information for the GX-9100 tool.

Toolbar

The toolbar is located just below the menu bar. It contains buttons that perform specific functions when clicked with the left mouse button. Table 11 shows the toolbar buttons and describes their functions.

Table 11: Toolbar Buttons

Toolbar Button	Menu Bar Equivalent	Description
	File--New	Opens a new configuration file.
	File--Open	Opens an existing configuration file.
	File--Save	Saves the current configuration.
	Edit--Add PM	Adds a programmable module or network input/output module to the current configuration.
	File--Print	Brings up the series of print dialog boxes, which allow you to select items to print, as well as set print parameters.
The following buttons only work with the DT-9100 DX LCD Display configuration:		
	**Edit--Cut**	Removes the currently selected data and places it on the clipboard.
	Edit--Copy	Places a copy of the currently selected data on the clipboard.
	Edit--Paste	Pastes the data from the clipboard into the currently selected line.

Pop-Up Menus

Pop-up menus display when you click the right mouse button on a point or module. The pop-up menu that displays depends on which type of point or module you click on. An example of the menu that displays when you click on an unconfigured Digital Output with the right mouse button is shown in Figure 16.

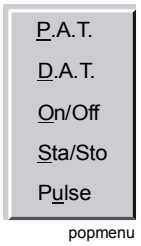


Figure 16: Unconfigured Digital Output Pop-Up Menu Example

An example of the pop-up menu that appears when you click on a configured module is shown below.

Figure 17: Configured Module Pop-Up Menu Example

Select an option by clicking it with the left mouse button or highlighting it with the arrow keys, then pressing <Enter>. Click the left mouse button outside of the menu or press <Esc> to exit the menu without choosing a selection.

User Names

Each input and output point, connection source point, destination point, and programmable module has a predetermined tag name. (See the Appendices for details on these names.) However, you may define an 8-character user name that identifies the function of each point and programmable module in the application being configured.

For programmable modules, inputs, and outputs, define these names in the data window's User Name field. Note that you can also add a 24-character description in the data window's Description field. For connection points, define the names by clicking the Input-Tag button (for destination points) or the Output-Tag button (for source points) in the appropriate data window, then enter the names in the fields next to the points. The View menu gives you the option to display the configuration with the predefined tag names or the user names.

Controller Menu

When started, the DX-9100 initial screen automatically defaults to Version 2.4. If you are using a different version controller, change the screen to reflect that version.

To switch between the versions:

1. Click Controller on the menu bar. The current controller version is the checked menu item.
2. Select another controller version from the menu. The screen changes to that version. See Figure 5 and Figure 6.

Defining Job Information

To define job information for a configuration:

1. Select Job Information from the Edit menu. The following dialog box will appear:

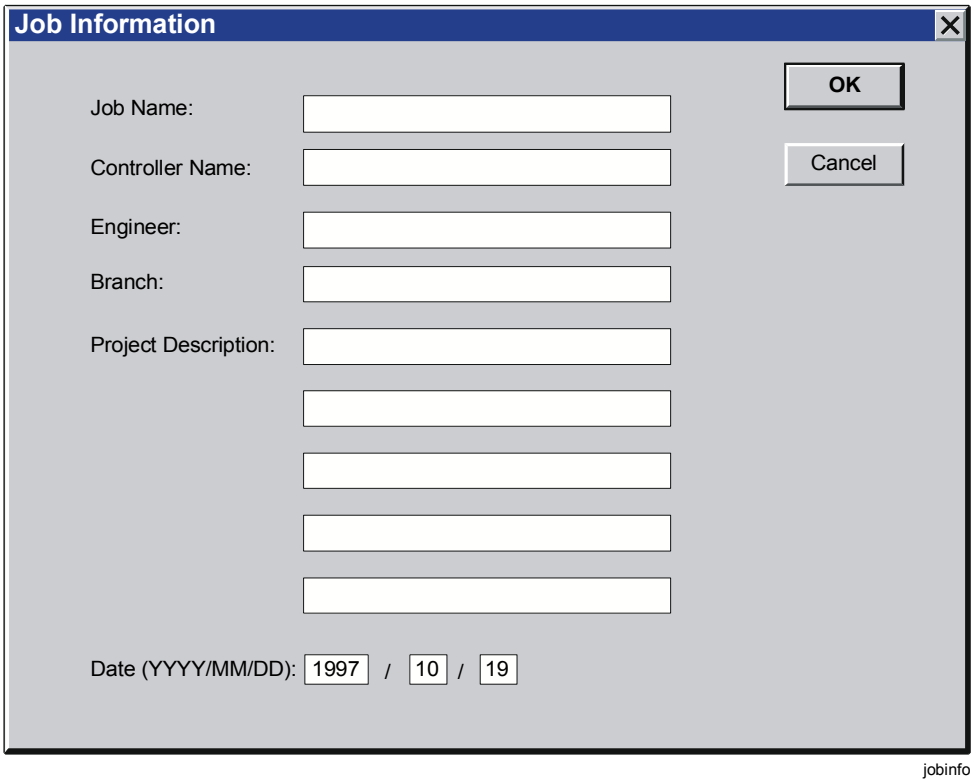


Figure 18: Job Information Dialog Box

2. Fill in the empty data fields. Note that the current date is automatically entered into the date field if it has not been entered previously.
3. Click OK when you are finished.

Defining the Global Data

To define the configuration's global data:

1. Select Global Data from the Edit menu. The following dialog box appears:

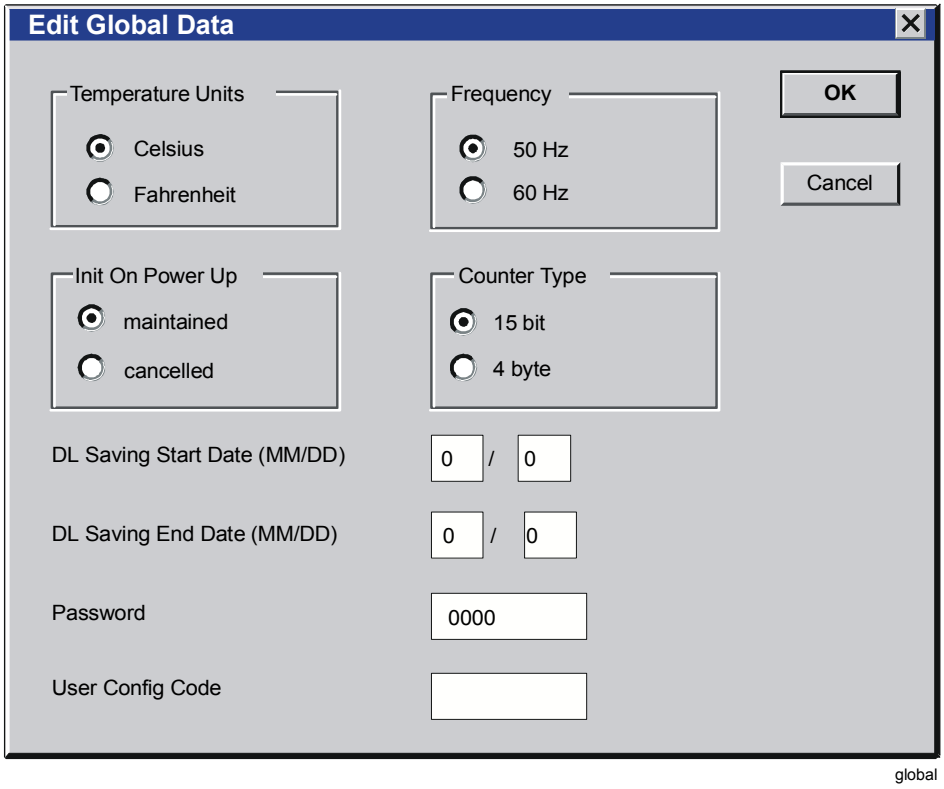


Figure 19: Edit Global Data Dialog Box

Notes: The User Configuration Code, used by the DX LCD Display unit, identifies the configuration to display the correct screens. It is downloaded to the controller and displayed on startup (Version 1.1 or later).

The Password protects a configuration loaded into a controller. Once the password is downloaded into the controller along with the configuration, the controller only allows another download or upload when the same password is entered. Changing the GX9100.INI file later, or loading a new configuration does not affect the password. If you forget the password, return the controller to the factory to reset it. Enter a password of 0000 in the Edit Global Data screen to disable the password.

The Password field is grayed and cannot be edited if the Password feature has not been enabled in the `GX9100.INI` file (see *Enabling Password Protection for the DX-9100 Download/Upload Dialogs (DX Version 1.4, 2.4, or 3.4)* under *Software Installation* at the beginning of this guide).

2. Click OK to save the values and close the dialog box.

Defining Analog Inputs and Digital Outputs

Defining analog inputs and digital outputs is a two step process. First, you must configure the AI or DO using the pop-up menus. Then, you must define the data associated with the AI or DO using the data windows.

AI or DO Configuration

To configure an analog input or digital output:

1. Using the right mouse button, click on the AI or DO you want to configure. Examples of the pop-up menus are shown below.

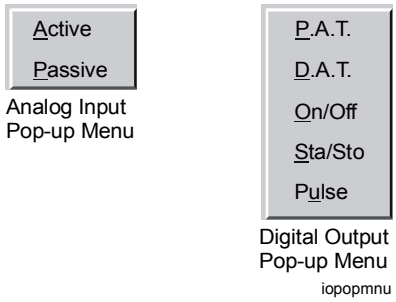


Figure 20: Analog Input and Digital Output Configuration Menus

2. Select the type of AI or DO you want from the pop-up menu using the left mouse button. A double border appears around the point to indicate that it is configured.

AI or DO Data Definition

To define the data associated with the AI or DO:

1. Click on the configured AI or DO with the right mouse button and select Data from the pop-up menu that appears, or highlight the point, then select Data from the Edit menu. A data window appears like that in Figure 21 or Figure 22.
2. Enter the desired values in the empty data fields. Use an asterisk (*) to make or modify connections from the data window.
3. Click the Input-Tag button to assign user names to the destination points (if applicable).
4. Click the Output-Tag button to assign user names to the source points (if applicable).
5. Click OK when you are finished entering data to save the values and exit the data window.

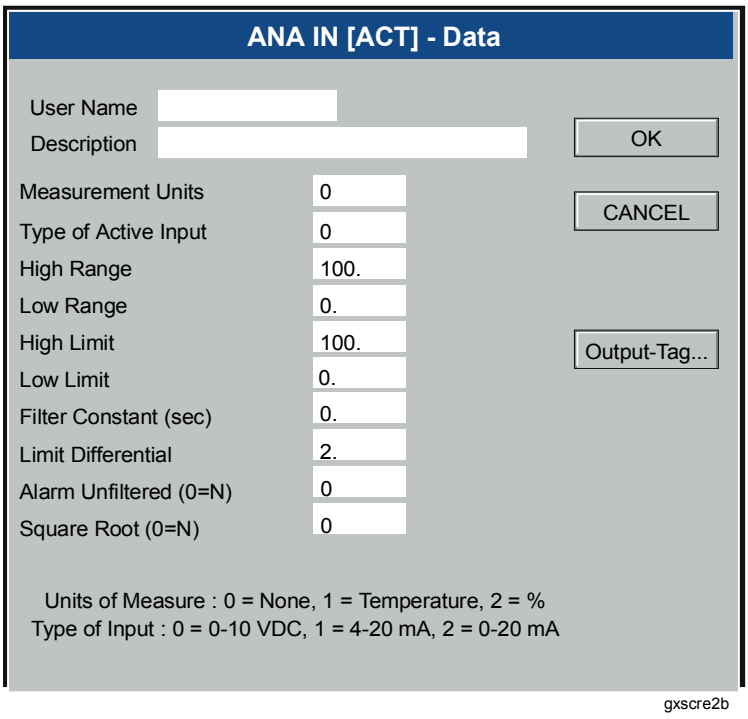


Figure 21: Active Analog Input Data Window

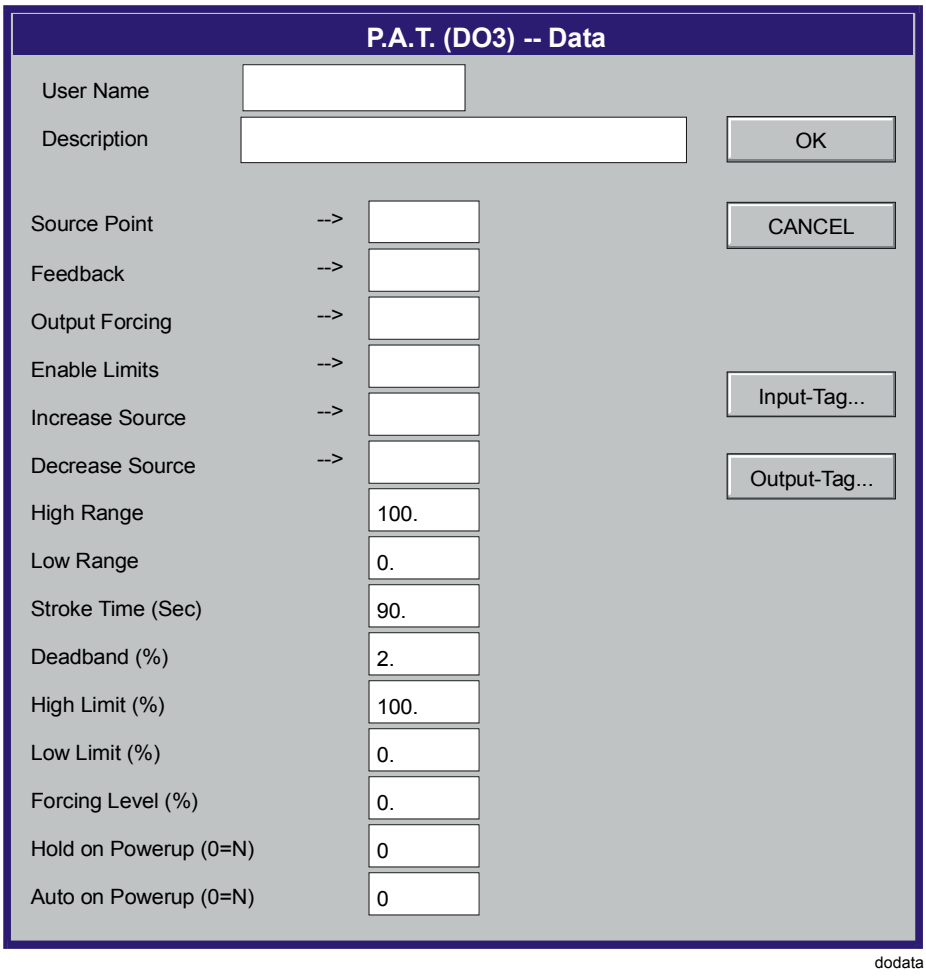


Figure 22: P.A.T. Digital Output Data Window

Defining Analog Outputs and Digital Inputs

To define analog outputs and digital inputs, only enter the data associated with the AO or DI.

To enter the associated data:

1. Click on the configured AO or DI with the right mouse button and select Data from the pop-up menu that appears, or highlight the point, then select Data from the Edit menu. A data window like that in Figure 23 or Figure 24 appears.

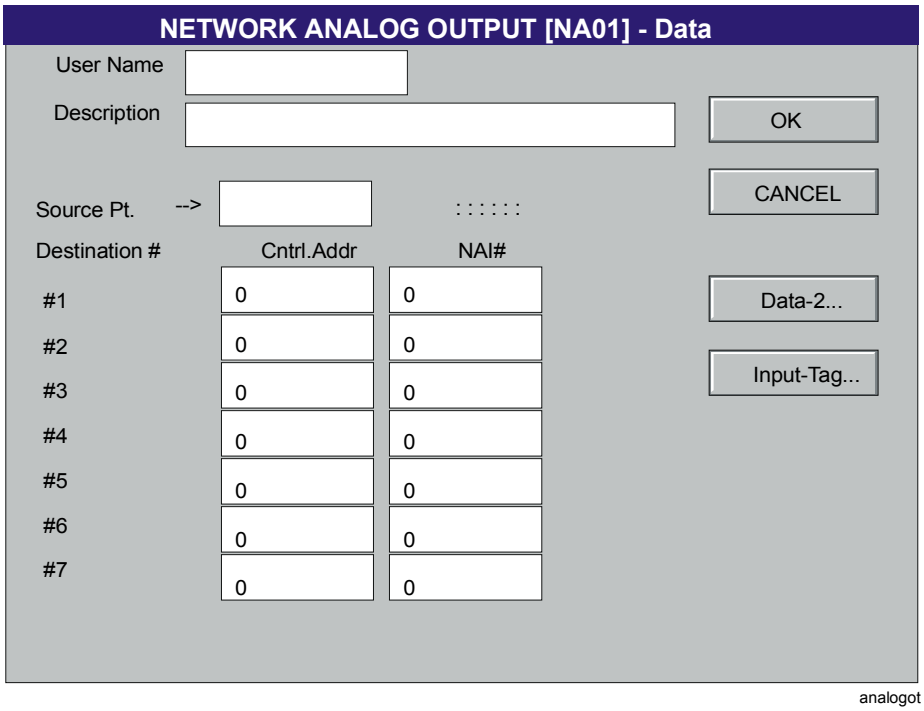


Figure 23: Analog Output Data Window

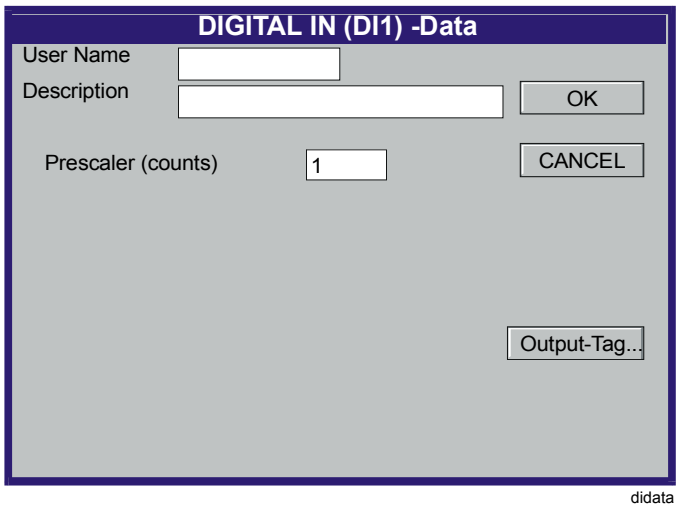


Figure 24: Digital Input Data Window

2. Enter the desired values in the empty data fields. Use an asterisk (*) to make or modify connections from the data window.
3. Click the Input-Tag button to assign user names to the destination points (if applicable).
4. Click the Output-Tag button to assign user names to the source points (if applicable).
5. Click OK when you are finished entering data to save the values and exit the data window.

Defining Modules

Table 12 shows the maximum number of each type of module you can use in a configuration.

Table 12: Module Type Limits

Type of Module	Maximum Number Allowed
Control **Numeric** **Totalization** **Sequencer** **Binary Sequencer**	12 total
XT or XTM	8 total
Time Schedule	8
PLC	8
Optimum Start/Stop	2
Analog Constants	1
Digital Constants	1
Exception Days	1
LRS1-32	1
LRS33-64	1
Trend Log	1
Network Modules	
NDO	8
NDI	8
NAO	16
NAI	16

Note: Once you reach a module's limit, that module type is removed from the Add PM menu. Also, module types not supported by the selected controller version do not appear on the Add PM menu.

Defining XT, XTM, and XP Modules

To configure XT and XTM modules:

1. Click on the Add PM button PM on the toolbar, or select Add PM from the Edit menu.
2. Select XT or XTM from the Add PM menu. A submenu appears with options for the XP type. XPs and XTMs can be analog, digital, or expanded digital.

Notes: The XP expanded digital options (preceded with EXP) only appear if the preceding module is an XT or XTM and not defined as EXP.

The inputs/outputs of an XP are connected to the first XT or XTM module. An expanded digital XT or XTM (EXP) represents the inputs/outputs of the second XP on the preceding XT or XTM.

The first XT/XTM software module actually represents two hardware modules.

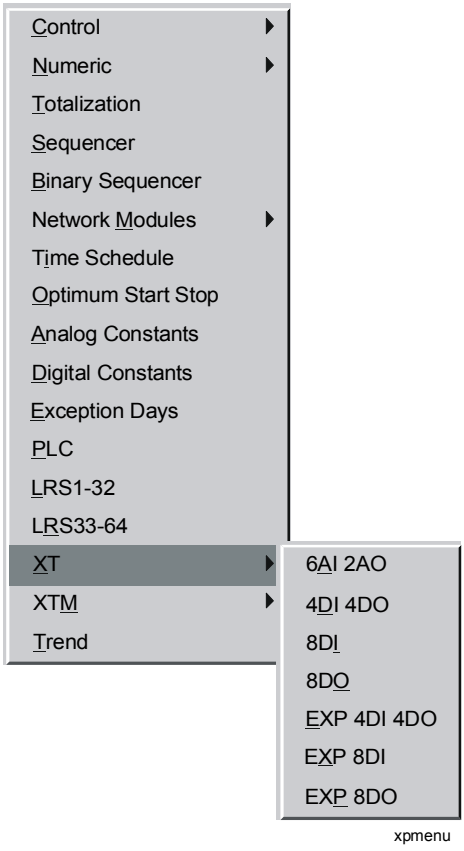


Figure 25: XT Extension Module Configuration Menus

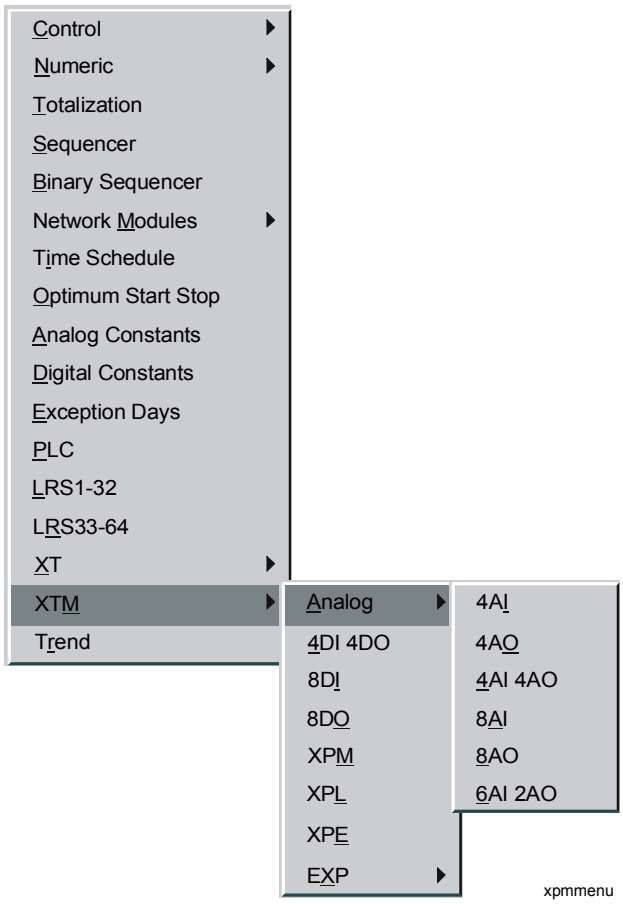


Figure 26: XTM Extension Module Configuration Menus

Configuring Analog XT Modules

For an XT module, there is only one type of analog XP module: six analog inputs and two analog outputs (6AI 2AO).

For an XTM module, there are several choices of analog XP modules (Table 13).

Table 13: XTM Analog Modules

Menu Option	Description
4AI*	four analog inputs
4AO*	four analog outputs
4AI 4AO*	four analog inputs and four analog outputs (2 XP modules)
8AI*	four analog outputs (2 XP modules)
8AO*	four analog outputs (2 XP modules)
6AI 2AO	six analog inputs and two analog outputs

* Not available in North America.

To configure an analog input for an XT or XTM:

1. Select XT or XTM from the Add PM menu.
2. Select the desired analog configuration from the XT or XTM submenu using the left mouse button. See Figure 25 and Figure 26. Additional analog inputs and outputs appear around the sides of the screen in Figure 27.

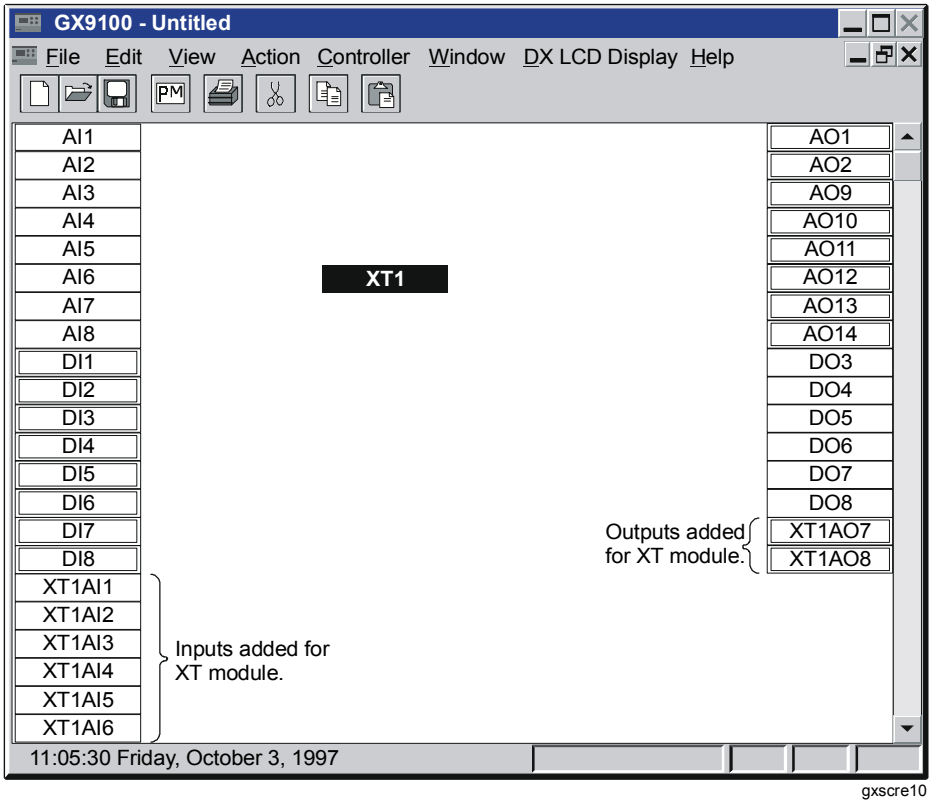


Figure 27: XT Analog Inputs and Outputs

Note: Input and output tags for XTM modules are the same as for XT modules (e.g., XTnAIm, XTnAOm).

3. Use the mouse to place the XT or XTM module block on the screen, then click the left mouse button.
4. Click on the desired XTnAIm with the right mouse button. The menu shown in Figure 28 appears.

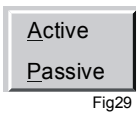


Figure 28: XT/XTM Analog Input Configuration Menu

5. Click on Active or Passive with the left mouse button to configure the analog input. A double border appears in the AI's function block to indicate that it is configured.

XT AI and AO Data Definition

To define the data associated with XT or XTM analog inputs and outputs:

1. Click on the configured XT AI or XT AO with the right mouse button and select Data from the pop-up menu that appears, or highlight the point, then select Data from the Edit menu. A data window similar to that in Figure 29 or Figure 30, shown below appears.

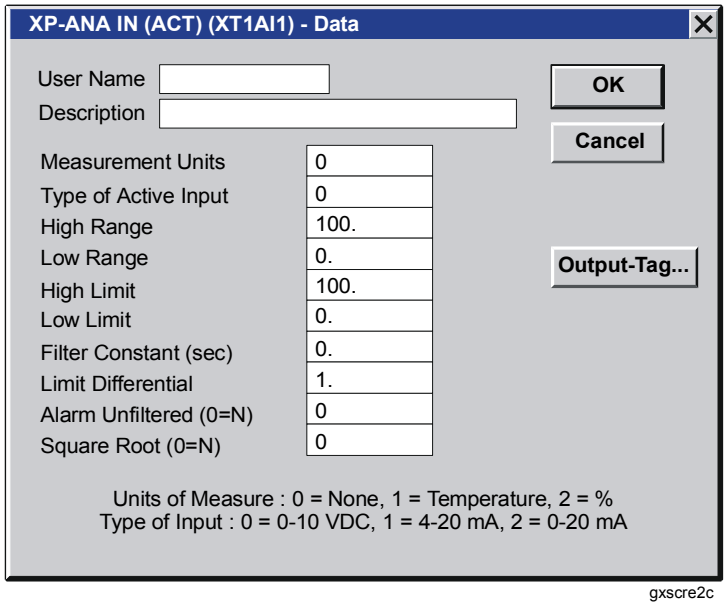

XP-ANA IN (ACT) (XT1AI1) - Data
User Name
Description
OK
Cancel
Measurement Units 0
Type of Active Input 0
High Range 100.
Low Range 0.
High Limit 100.
Low Limit 0.
Filter Constant (sec) 0.
Limit Differential 1.
Alarm Unfiltered (0=N) 0
Square Root (0=N) 0
Output-Tag...
Units of Measure : 0 = None, 1 = Temperature, 2 = %
Type of Input : 0 = 0-10 VDC, 1 = 4-20 mA, 2 = 0-20 mA
gxscre2c

Figure 29: XT/XTM Analog Input Data Window

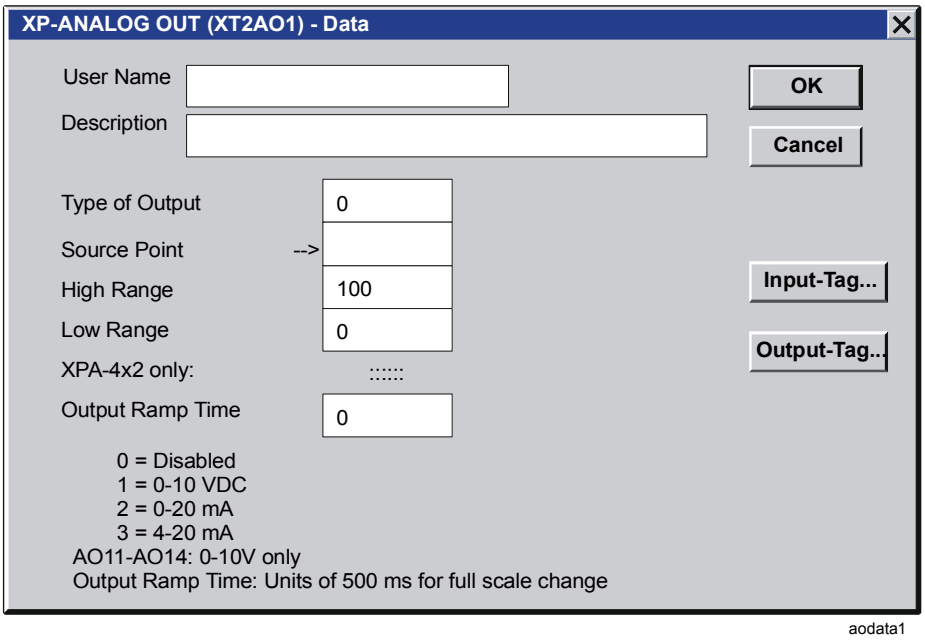


Figure 30: XT/XTM Analog Output Data Window

2. Enter the desired values in the empty data fields. Use an asterisk (*) to make or modify connections from the data window.
3. Click the Input-Tag button to assign user names to the destination points (if applicable).
4. Click the Output-Tag button to assign user names to the source points (if applicable).
5. Click OK when you are finished entering data to save the values and exit the data window.

Configuring Digital or Expanded Digital Extension Modules

For XT modules, digital or expanded digital XP modules may have eight digital inputs (8DI or EXP8DI), four digital inputs and four digital outputs (4DI 4DO or EXP 4DI 4DO), or eight digital outputs (8DO or EXP 8DO), as shown in Figure 31.

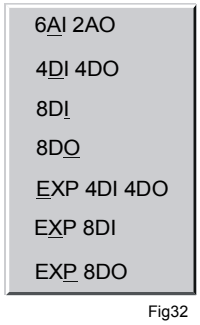


Figure 31: Digital and Expanded Digital Extension Module Configuration Menu for XT

For XTM modules, digital or expanded digital XP modules of the type XPM-4x1 (momentary output relays), XPL-4x1 (magnetically latched output relays), or XPE-4x1 (electrically latched output relays) may also be configured, as shown in Figure 32 below. Refer to the *XTM-905 Extension Module, XPx-xxx Expansion Modules Technical Bulletin* (XTM-905 is not available in North America as of May, 1999) for details of these modules.

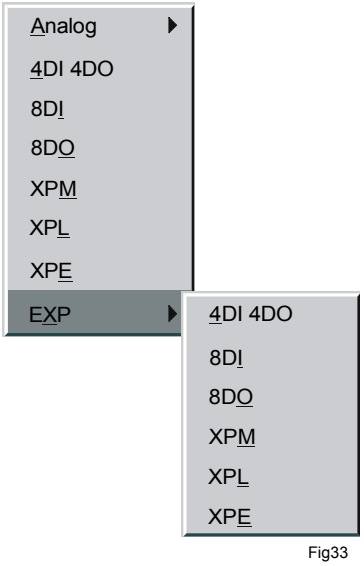


Figure 32: Digital and Expanded Digital Extension Module Configuration Menu for XTM

Note: Modules of type XPE-4x4 (x=0, 1, 2, or 3) must be configured as 4DI 4DO.

To configure digital or expanded digital extension modules:

1. Select XT or XTM from the Add PM menu.
2. Select the desired combination of digital inputs and/or outputs from the XT/XTM submenu using the left mouse button. Additional inputs and/or outputs appear around the sides of the screen (Figure 33).

Note: Expanded digital module options (options preceded with EXP) only appear on the submenu if the preceding module is an XT or XTM and the XP type is not defined as EXP.

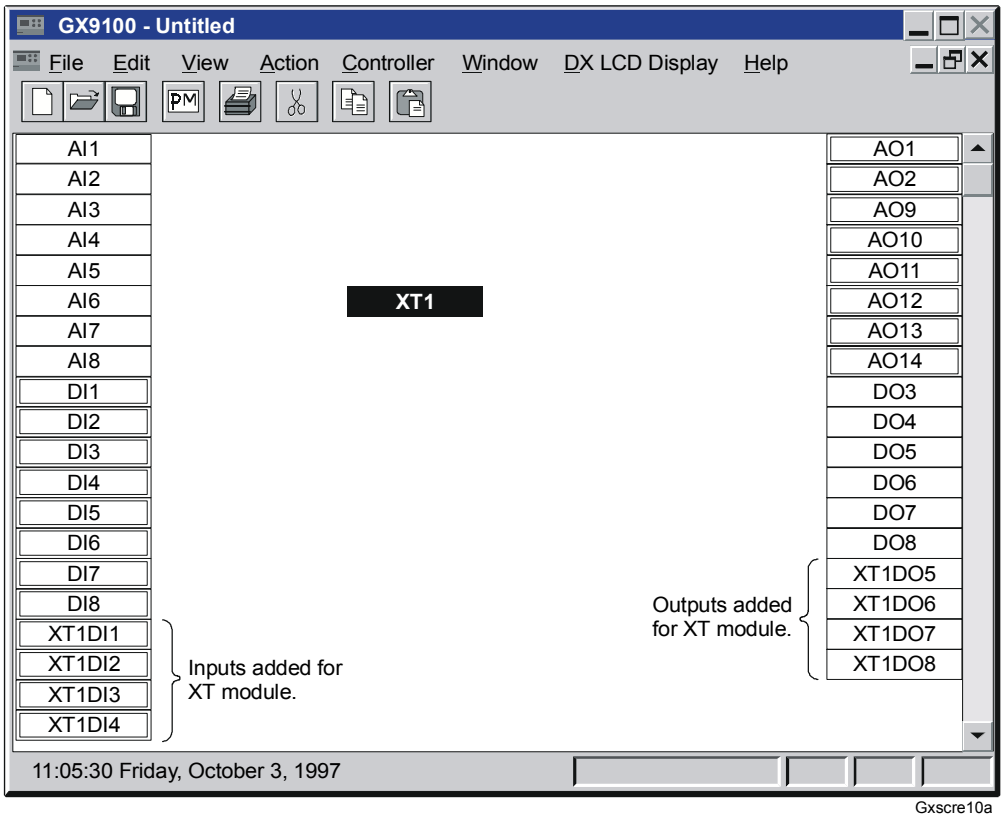


Figure 33: XT Digital Inputs and Outputs

Note: Input and output tags for XTM modules are the same as for XT modules (e.g., XTnDIm, XTnDOm).

3. Use the mouse to place the XT or XTM module block on the screen, then press the left mouse button.
4. For outputs only, click on the desired output with the right mouse button. The following menu appears:

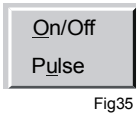


Figure 34: XT/XTM Digital Output Configuration Menu

5. Click on On/Off or Pulse with the left mouse button to configure the digital output. A double border appears in the DO's function block to indicate that it is configured.

Notes: Configure all DOs as On/Off or Pulse regardless of whether they are used. The only exceptions are the 4-output relay modules (XP-9107) When only one 4-output module is installed, select 8DO, but only configure DO1-DO4. When two 4-output modules are installed, configure both as one 8DO module, and configure DO1-DO8.

IMPORTANT:	Configure XPL-4x1, and XPE-4x1 modules as Pulse. The action of the outputs is determined by the hardware, not by the configuration.

XT DI and DO Data Definition

To define the data associated with XT and XTM digital inputs and outputs:

1. Click on the configured XT DI or XT DO with the right mouse button and select Data from the pop-up menu that appears, or highlight the point, then select Data from the Edit menu. A data window similar to Figure 35 or Figure 36 appears.

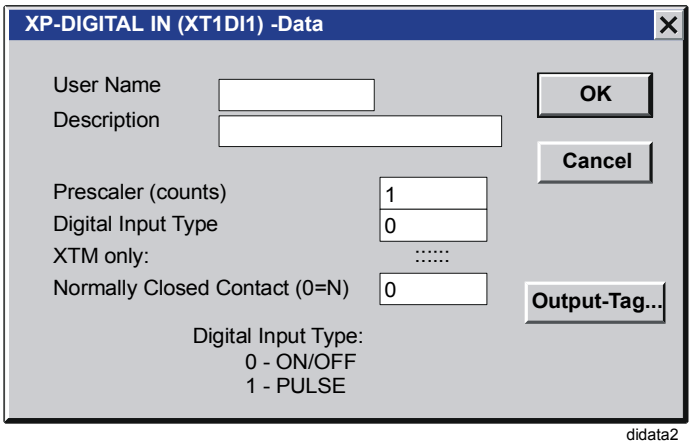


Figure 35: XT/XTM Digital Input Data Window

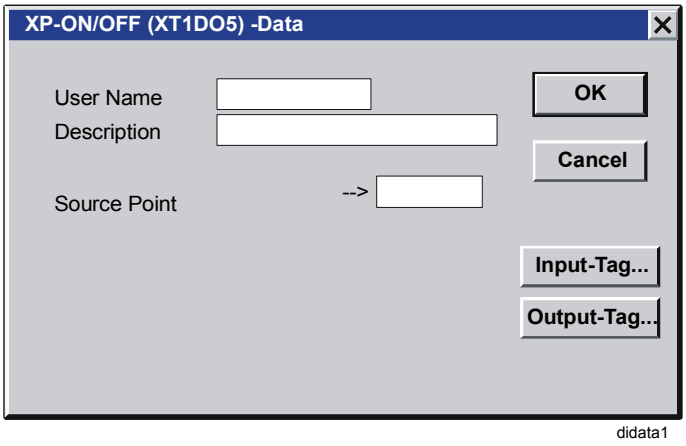


Figure 36: XT/XTM Digital Output Data Window

2. Enter the desired values in the empty data fields. Use an asterisk (*) to make or modify connections from the data window.
3. Click the Input-Tag button to assign user names to the destination points (if applicable).
4. Click the Output-Tag button to assign user names to the source points (if applicable).
5. Click OK when you are finished entering data to save the values and exit the data window.

XT and XTM Data Definition

To define the data associated with the operation of the complete XT or XTM module set:

1. Click on the XT or XTM box with the right mouse button and select Data from the pop-up menu that appears, or highlight the module, then select Data from the Edit menu. A data window, similar to Figure 37 or Figure 38 appears.

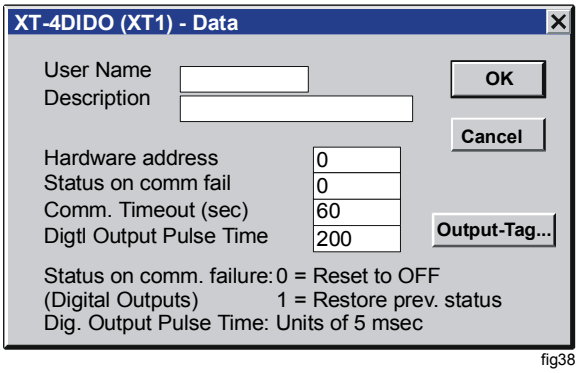


Figure 37: XT Data Window

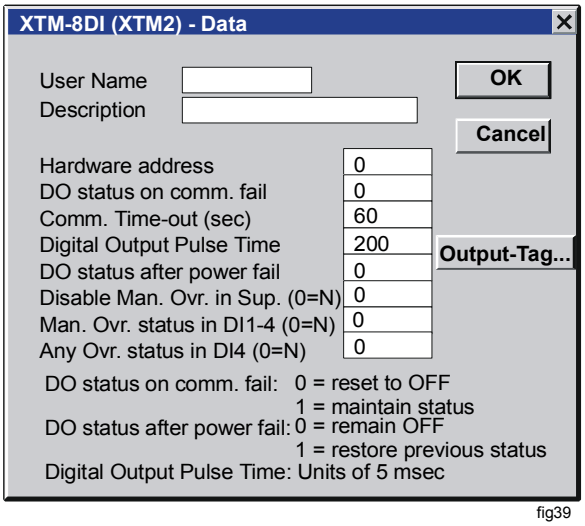

XTM-8DI (XTM2) - Data
User Name
Description
OK
Cancel
Hardware address 0
DO status on comm. fail 0
Comm. Time-out (sec) 60
Digital Output Pulse Time 200
DO status after power fail 0
Disable Man. Ovr. in Sup. (0=N) 0
Man. Ovr. status in DI1-4 (0=N) 0
Any Ovr. status in DI4 (0=N) 0
Output-Tag...
DO status on comm. fail: 0 = reset to OFF
1 = maintain status
DO status after power fail: 0 = remain OFF
1 = restore previous status
Digital Output Pulse Time: Units of 5 msec
fig39

Figure 38: XTM Data Window

2. Enter the desired values in the empty data fields.
3. Click on the Output-Tag button to assign user names to the source points.
4. Click on OK when you are finished entering data to save the values and exit the data window.

Configuring Programmable Modules

To configure a programmable module:

1. Click on the Add PM button PM on the toolbar, or select Add PM from the Edit menu. The Add PM menu (Figure 39) appears.

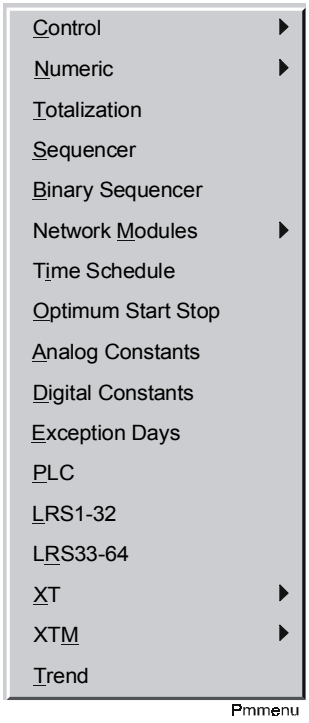


Figure 39: Programmable Module Configuration Menu

2. Select the type of module from the menu. If opting for a control or numeric module, a submenu appears (Figure 40).

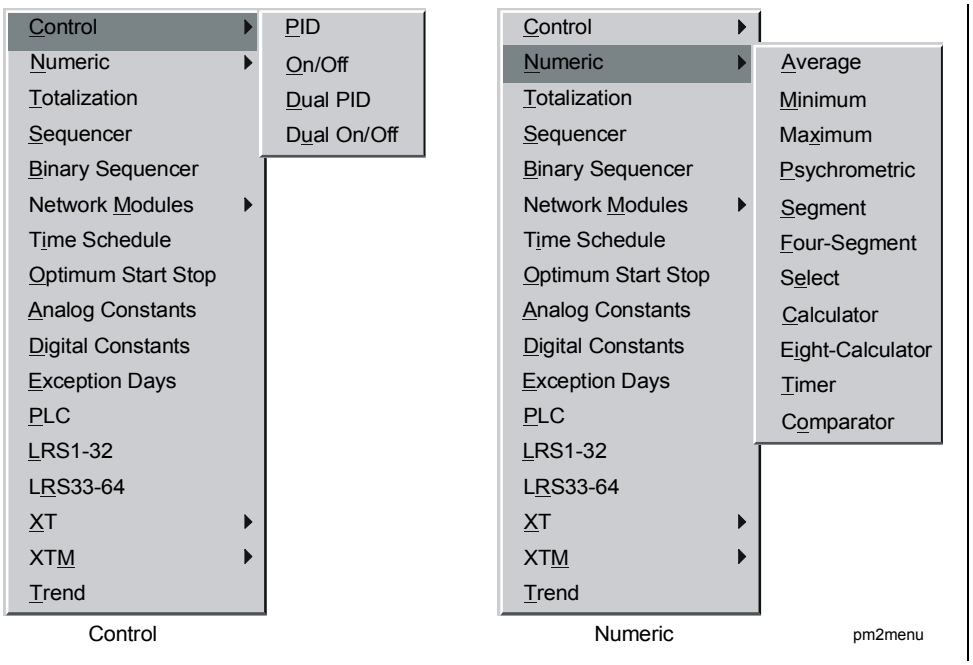


Figure 40: Control and Numeric Configuration Menus

Once you have selected the type, a highlighted box with a dashed border and the type name and module number appears next to the pointer.

3. Place the module on the page by moving it to the desired position using the mouse, then click the left mouse button. You can move the module at any time by clicking and dragging it to a new position on the screen.

Programmable Module Data Definition

To define the data associated with a programmable module:

1. Click on the programmable module with the right mouse button and select Data from the pop-up menu that appears, or highlight the module, then select Data from the Edit menu. A data window like the one shown in Figure 41 appears.

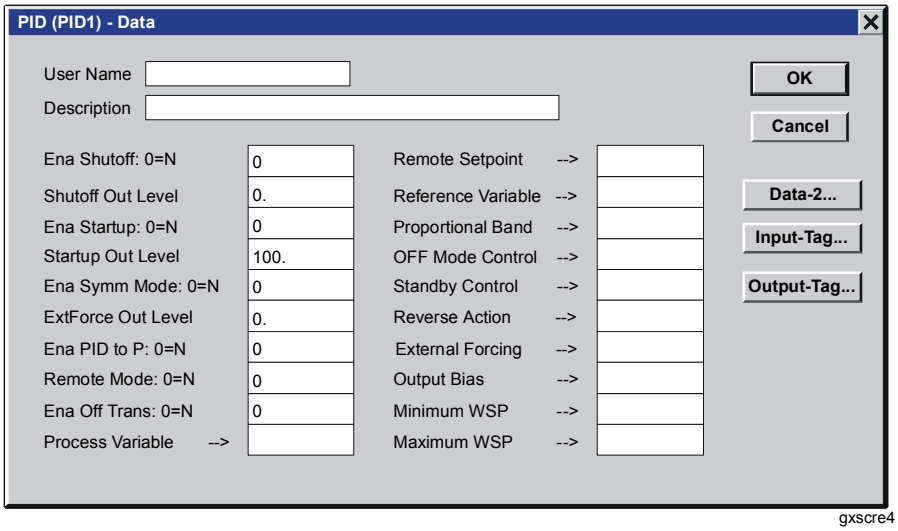


Figure 41: PID Module Data Window

2. Enter the desired values in the empty data fields. Use an asterisk (*) to make or modify connections from the data window.
3. Click the Input-Tag button to assign user names to the destination points (if applicable).
4. Click the Output-Tag button to assign user names to the source point (if applicable).
5. If the module has two pages, click the Data-2 button to access the second page. An example of the second page is shown below.

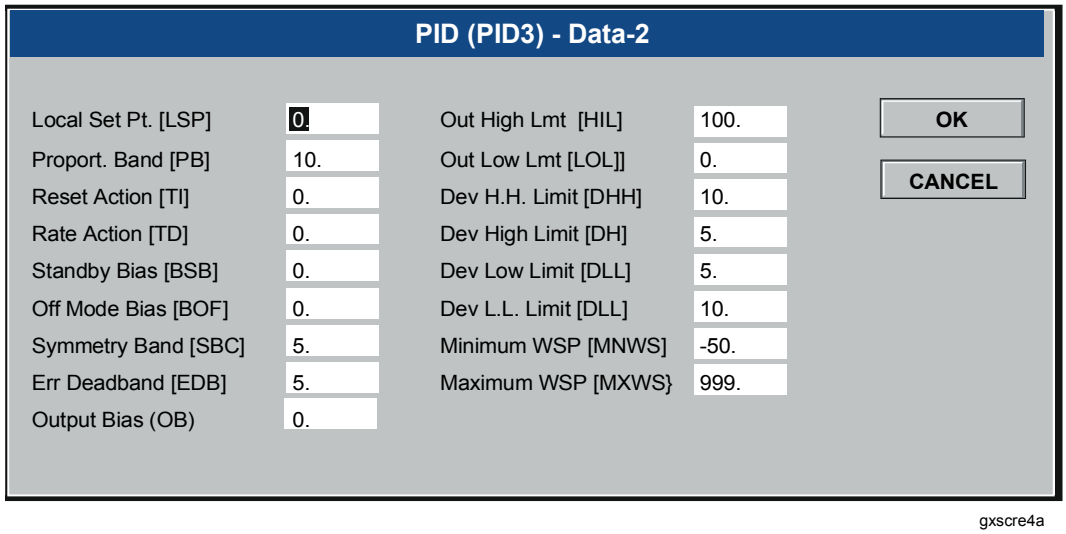

PID (PID3) - Data-2
Local Set Pt. [LSP] 0.
Proport. Band [PB] 10.
Reset Action [TI] 0.
Rate Action [TD] 0.
Standby Bias [BSB] 0.
Off Mode Bias [BOF] 0.
Symmetry Band [SBC] 5.
Err Deadband [EDB] 5.
Output Bias (OB) 0.
Out High Lmt [HIL] 100.
Out Low Lmt [LOL]] 0.
Dev H.H. Limit [DHH] 10.
Dev High Limit [DH] 5.
Dev Low Limit [DLL] 5.
Dev L.L. Limit [DLL] 10.
Minimum WSP [MNWS] -50.
Maximum WSP [MXWS} 999.
OK
CANCEL
gxscre4a

Figure 42: PID Module Second Page

6. Enter the desired values in the empty data fields of the second window. Use an asterisk (*) to make or modify connections.

7. Click OK to save the new values and return to the first window, or Cancel to return to the first window without saving the values.
8. Click OK when you are finished to save all values and exit the data window.

Defining Network Modules (DX Version 3.x Only)

To configure a network module:

1. Click on the Add PM button PM on the toolbar, or select Add PM from the Edit menu.
2. Select Network Modules from the menu. A submenu appears (Figure 43).

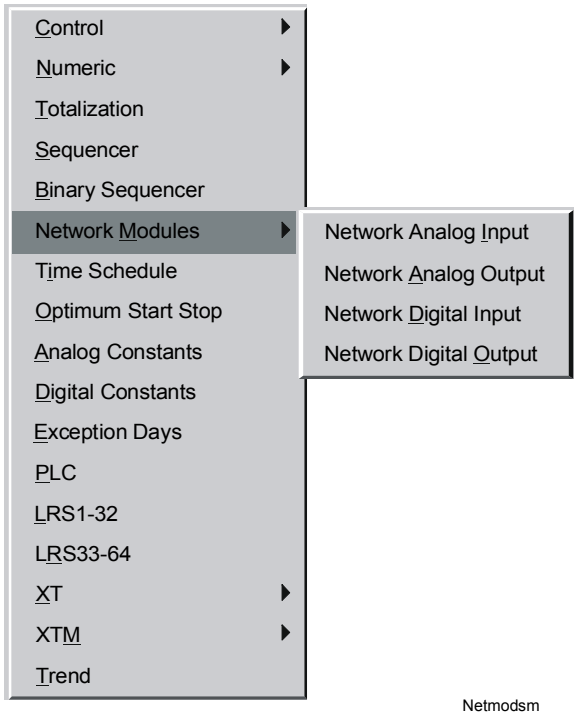


Figure 43: Network Modules Submenu

3. Select Network Analog Input, and a highlighted box with a dashed border and the name NAIn appears next to the pointer.
4. Place the module on the page by moving it to the desired position using the mouse, then click the left mouse button. You can move the module at any time by clicking and dragging it to a new position on the screen.

5. Repeat the same procedure, using the submenu options Network Digital Input (NDIn), Network Analog Output (NAOn), and Network Digital Output (NDOn) to define the network modules.

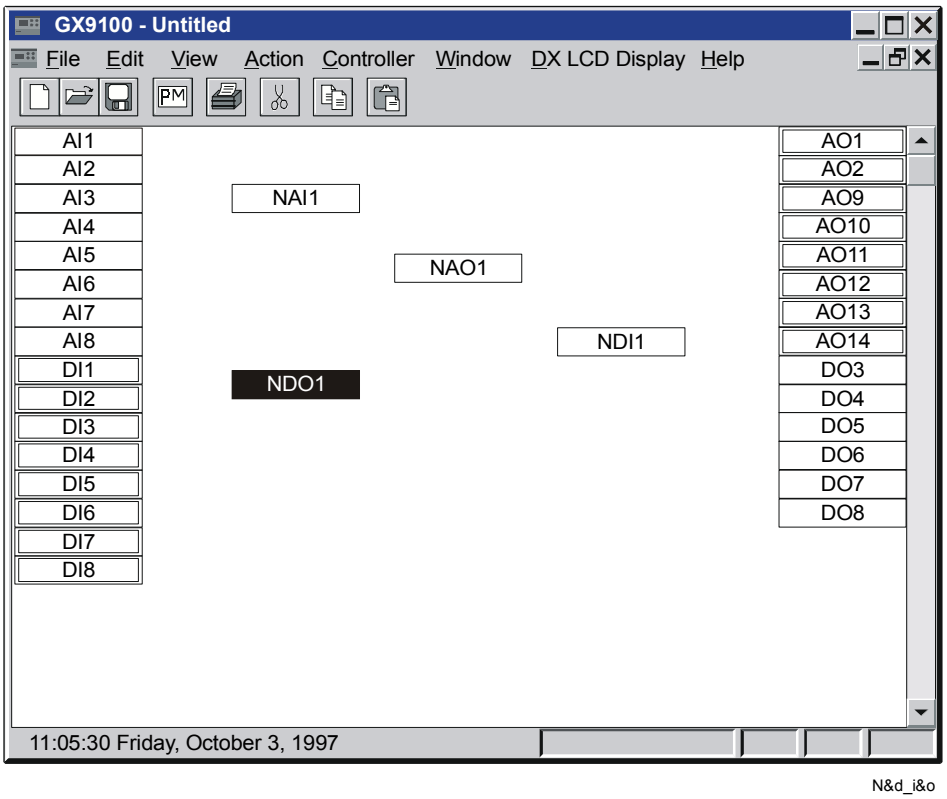


Figure 44: Network Analog and Digital Modules

Network Analog Input Module Data Definition

To define the data associated with the network analog input module:

1. Right click on the configured NAIn and select Data from the pop-up menu that appears; or highlight the module, then select Data from the Edit menu. A data window like Figure 45 appears.

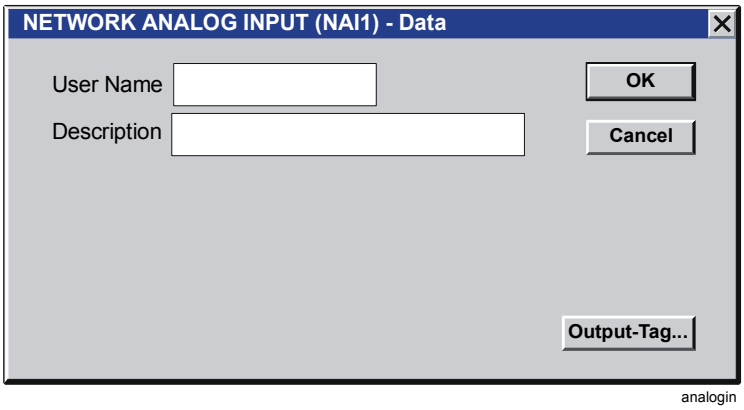


Figure 45: Network Analog Input Data Window

2. Enter the user name and description as appropriate.

3. Click on the Output-Tag button and assign user names to the source points as appropriate.
4. Click on OK when you are finished to save all entries and exit the data window.

Network Digital Input Module Data Definition

To define the data associated with the network digital input module:

1. Right click on the configured NDIn and select Data from the pop-up menu that appears, or highlight the module, then select Data from the Edit menu. A data window like that in Figure 46 appears.

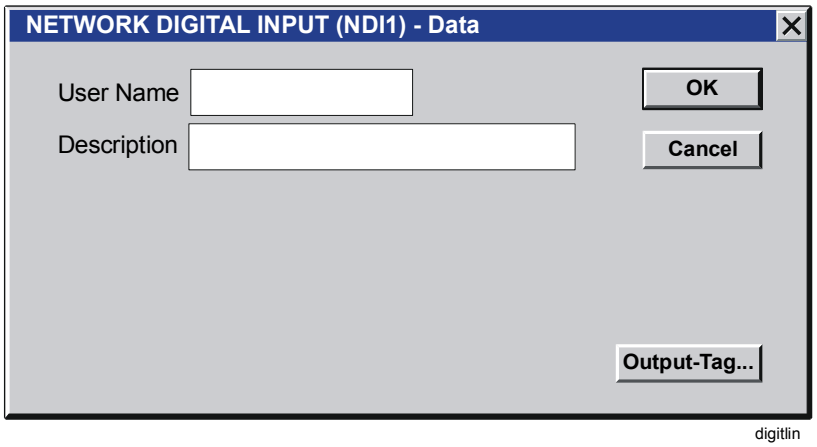


Figure 46: Network Digital Input Data Window

2. Enter the user name and description as appropriate.
3. An Output-Tag can be assigned to each of the 16 binary points that each NDIn accommodates. Click on Output-Tag to enter the appropriate user names as shown in Figure 47.

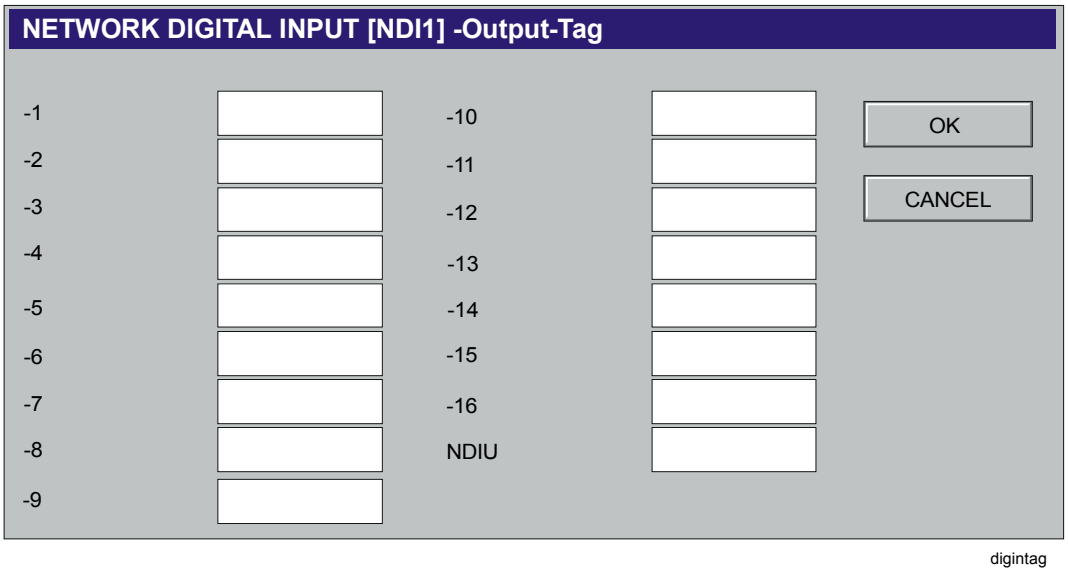


Figure 47: Network Digital Input (NDIn) Output-Tag Window

4. Click on OK when you are finished to save all entries and exit the data window.

Network Analog Output Module Data Definition

To define the data associated with the network analog output module:

1. Click on the configured NAOn with the right mouse button and select Data from the pop-up menu that appears; or highlight the module, then select Data from the Edit menu. A data window like Figure 48 appears.

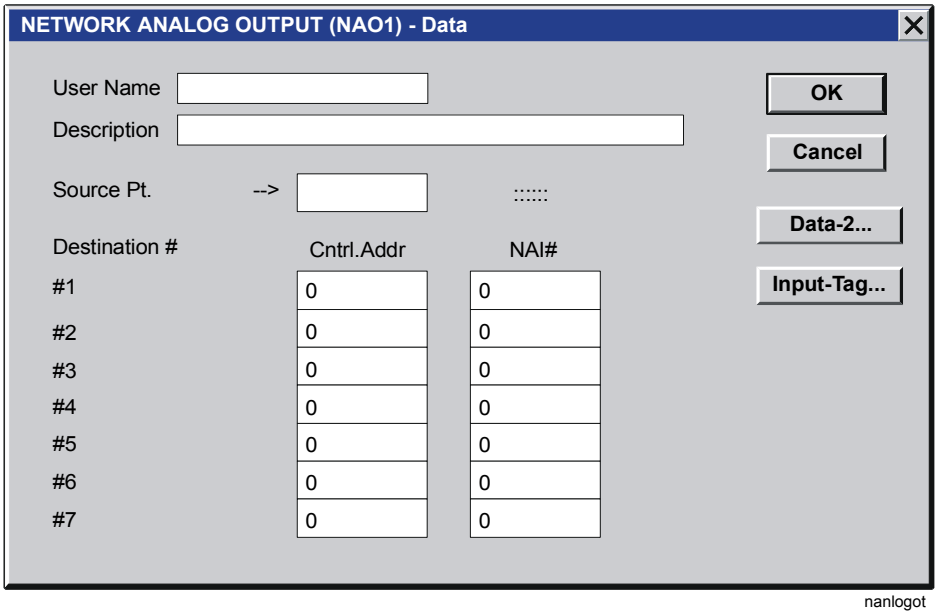


Figure 48: Network Analog Output (NAOn) Data Window

2. Enter the user name and description as appropriate.
3. Enter the Input-Tag for the source point of the network analog output.

Note: The network analog output is connected to one source point in the same DX controller. Use an asterisk (*) to make the connections in the data window.

NAOn Destination Definitions

1. Enter the destination controller's addresses and the corresponding network analog input points. Click on Data-2 to define Destination Controllers 8-16.
2. Click on OK when you are finished to save all entries and exit the data window.

Network Digital Output Module Data Definition

The NDOn contains up to 16 source binary points. Make connections between DX source points and NDOn in the usual way.

To define network digital outputs:

1. Click on the configured NDOn with the right mouse button and select Data from the pop-up menu that appears, or highlight the module, then select Data from the Edit menu. A data window like the one shown in Figure 49 appears.

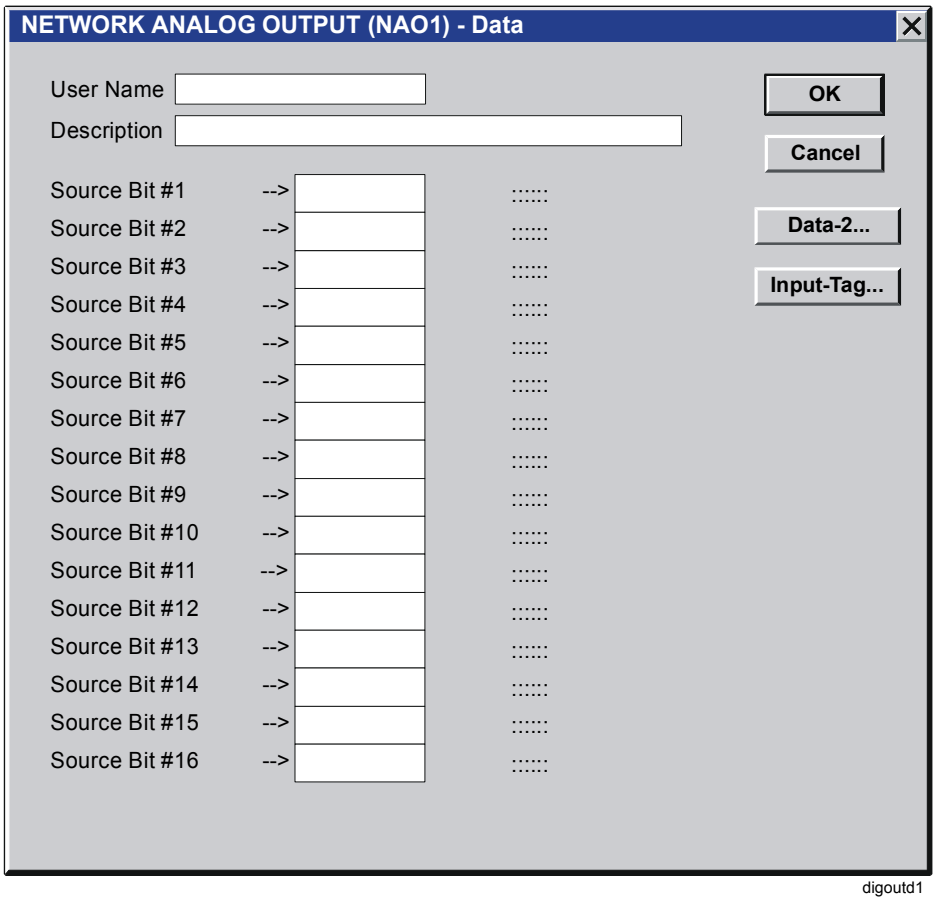


Figure 49: Network Digital Output (NDOn) Data Window

2. The connected source points are shown. Enter the user name and description as appropriate.
3. Enter Input-Tag for the source points as appropriate.

Note: The NDO contains up to 16 source binary points in the same DX controller. Use an asterisk (*) to make connections between DX source points and NDOn in the data window.

NDOn Destination Definitions

1. To define destinations, click on Data-2. The following screen appears:

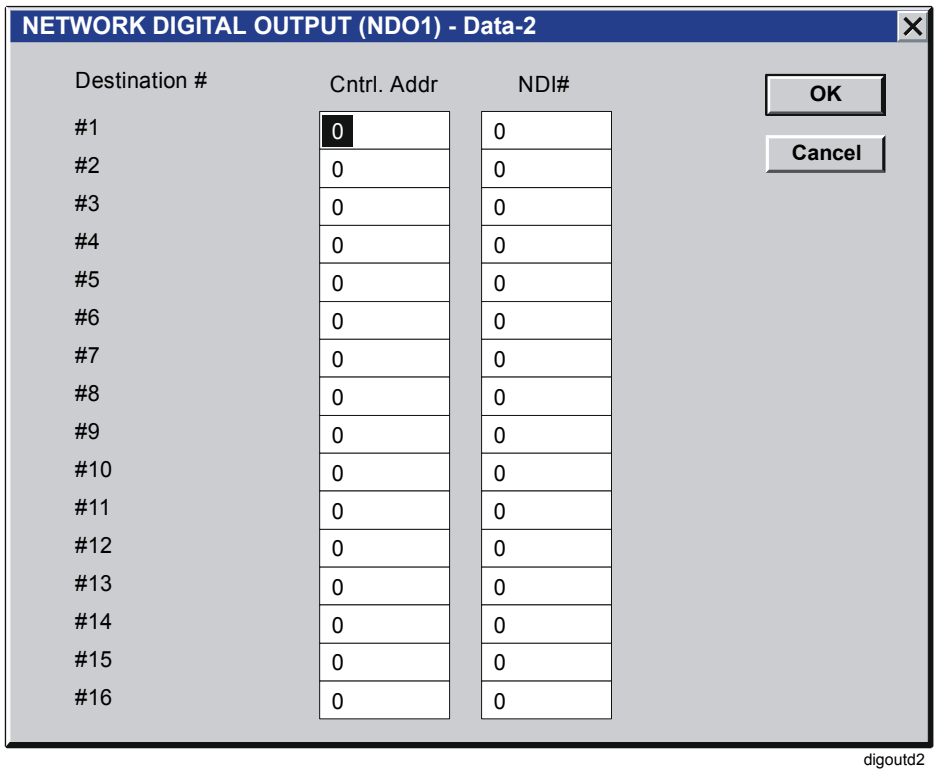


Figure 50: Network Digital Output (NDOn) Data-2 Window

2. Enter the destination controller's addresses and the corresponding network digital input points.
3. Click on OK when you are finished to save all entries and exit the data window.

Defining PLC Modules

The GX-9100's software-implemented Programmable Logic Controller (PLC) supports most of the functions available in dedicated PLCs. PLC functions are defined in ladder diagrams. In the GX-9100 Graphic Configuration Software, the PLC is subdivided into eight pages, PLC1 to PLC8; each is represented by a separate ladder diagram and a separate module block on the screen.

Table 14 lists common instructions for building a ladder diagram.

Table 14: PLC Instructions

Module	Instructions
NOP	No operation.
LOAD	Loads the value of the addressed logic variable into the result status.
LOAD NOT	Loads the inverted value of the addressed logic variable into the result status.
AND	Logical AND between the value of the addressed logic variable and the result status.
AND NOT	Logical AND between the inverted value of the addressed logic variable and the result status.
OR	Logical OR between the value of the addressed logic variable and the result status.
OR NOT	Logical OR between the inverted value of the addressed logic variable and the result status.
ANDB	Logical AND operation between two blocks.
ORB	Logical OR operation between two blocks.
OUT	Transfers the result status to the addressed logic variable.
OUT NOT	Transfers the inverted result status to the addressed logic variable.
COS	Change-of-state of the result status set the result status to 1 for one program cycle.
SET	Sets the addressed logic variable to the logical 1 if the result status is 1.
RST (RESET)	Resets the addressed logic variable to the logical 0 if the result status is 1.
RSR (RESTART)	Marks the place in the graphic ladder diagram for the restart of the program cycle when there has been no power failure or processor reset. (Location of RSR is given in END instruction in program code.)

Add the PLC Module Block

To add a PLC module block:

1. Click on the Add PM button on the toolbar, or select Add PM from the Edit menu.
2. Select PLC from the Add PM menu.
3. Place the PLC module block on the screen by dragging it to the appropriate position, then click once to anchor it.

Add Instructions to the Ladder Diagram

To add instructions to the ladder diagram:

1. Double-click on the PM module block. The following screen appears:

Note: The top of the diagram is numbered (PLC1-PLC8). The User Name and Description fields can only be changed from the PLC block's data window.

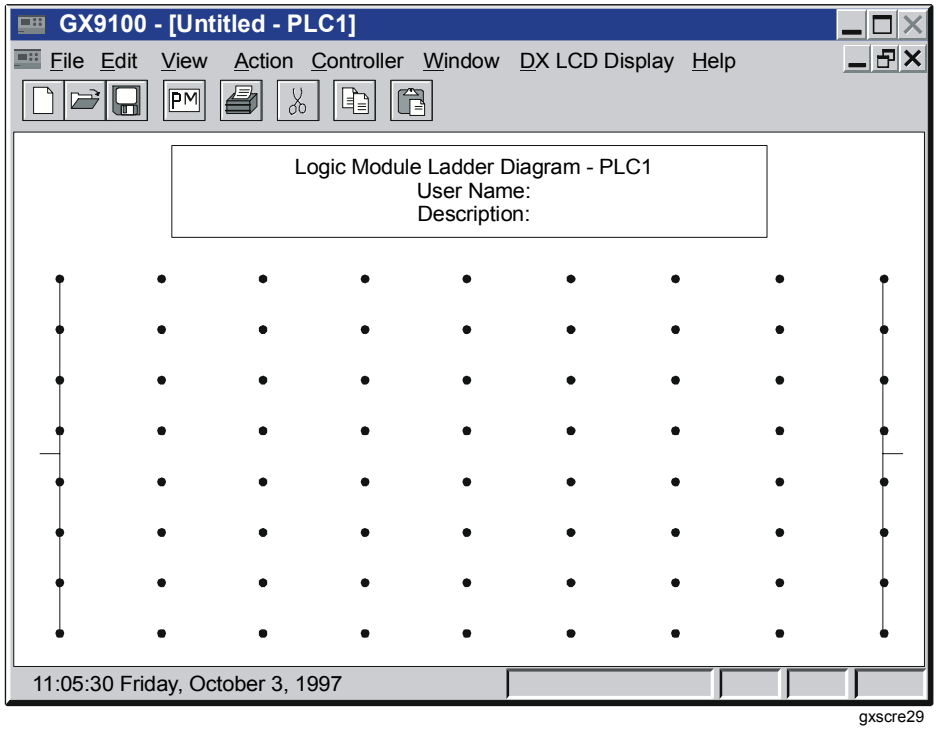


Figure 51: Initial Ladder Diagram

The diagram has eight rows. Each row has eight dots called hot points. Double clicking on the control box in the corner allows you to leave the diagram. Upon leaving the diagram, you are prompted to save changes if you have not done so.

2. Click on the hot point at the top left. The dialog box shown in Figure 52 appears:

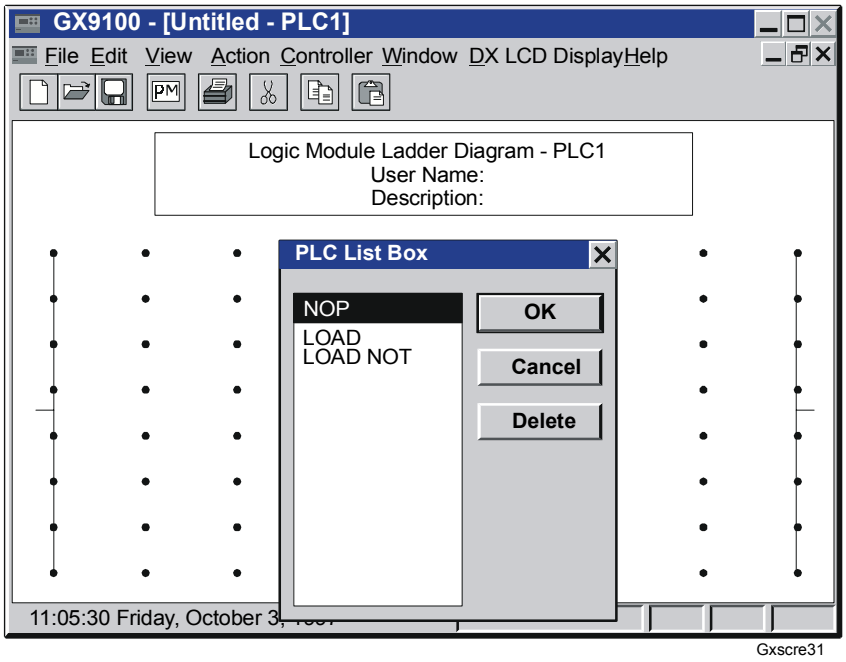


Figure 52: Selecting the First Hot Point

You can select LOAD or LOAD NOT as the first instruction. If you select LOAD and click on OK, the following screen appears:

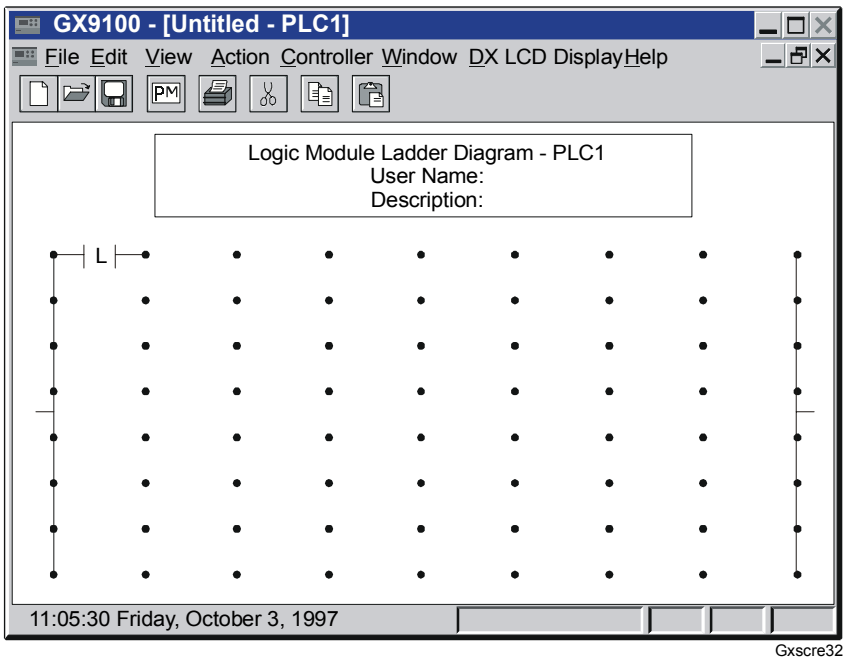


Figure 53: Adding the LOAD Symbol

Note: If you select LOAD NOT, the symbol will look like the LOAD symbol with a slash through the L.

The first element of subsequent rows or rows on subsequent pages may also be the RSR (Restart) instruction. The RSR instruction marks the place in the PLC program where execution will begin as long as there has been no power failure to the DX-9100 Controller.

All rows and pages before the RSR instruction will only be executed when the DX-9100 Controller is powered up after a power failure. This feature allows the creation of a power-up routine starting in Row 1 of Page 1 and ending in the row before the RSR instruction.

Only one RSR instruction may be defined. If no RSR instruction is defined, the PLC program will always begin at Row 1 on Page 1.

Note: It is not possible to select a hot point if it is preceded by a blank column or if the row above the point is empty.

3. Continue to click on unused hot points and add instructions to the ladder diagram until you have completed your PLC program. The ladder diagram should look similar to the one in Figure 54:

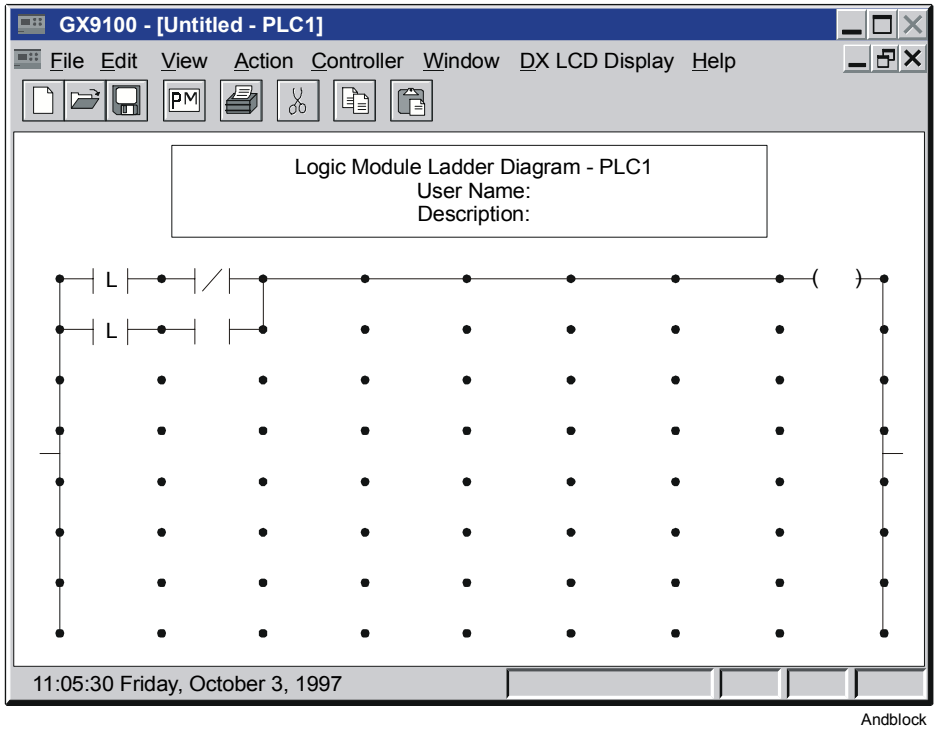


Figure 54: Example of a PLC Ladder Diagram

Creating Logic Blocks

To create a logic block within a line, select LOAD or LOAD NOT to begin the block and ENDB to end the block. The letter B marks the end of the block.

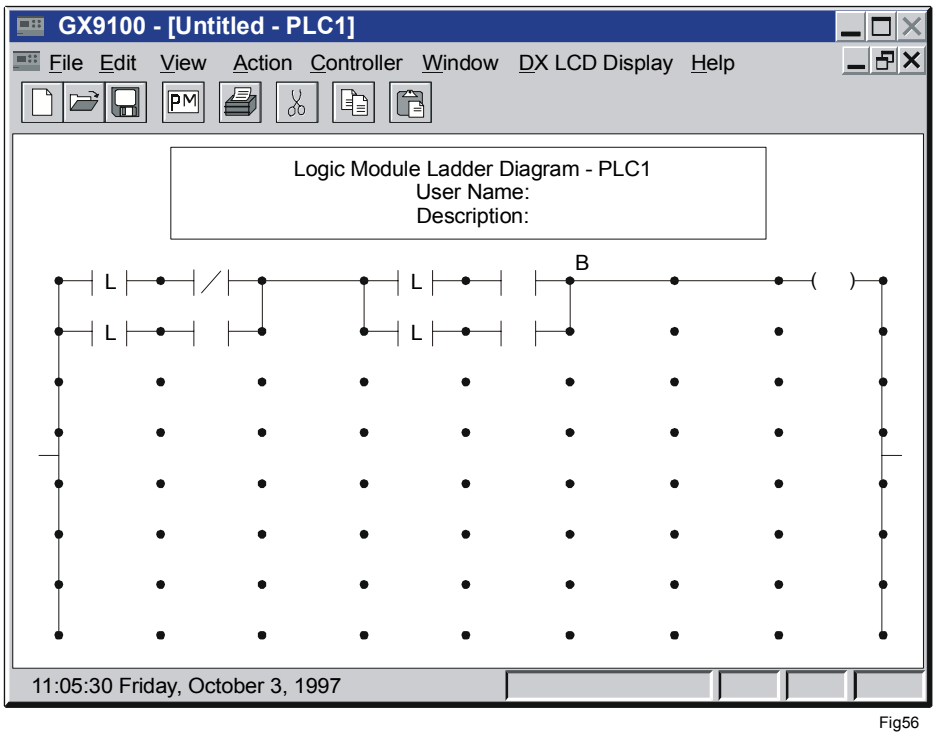


Figure 55: Example of a Logic Block within a Line

To create OR loops within logic blocks, select ORB and then LOAD or LOAD NOT. The OR block will begin at the LOAD or LOAD NOT instruction of the currently open logic block and end at the point where the ORB was entered. The block will automatically be completed with NOP instructions, which may subsequently be changed to AND instruction. Figure 55 shows an example of a logic block within a line. The elements in the second row form OR blocks.

Add Associated Logic Variables to Instructions

To assign an associated logic variable to each instruction:

1. Click on the center of the first PLC instruction. The intermediate menu showing all configured modules appears. It should similar to Figure 56:

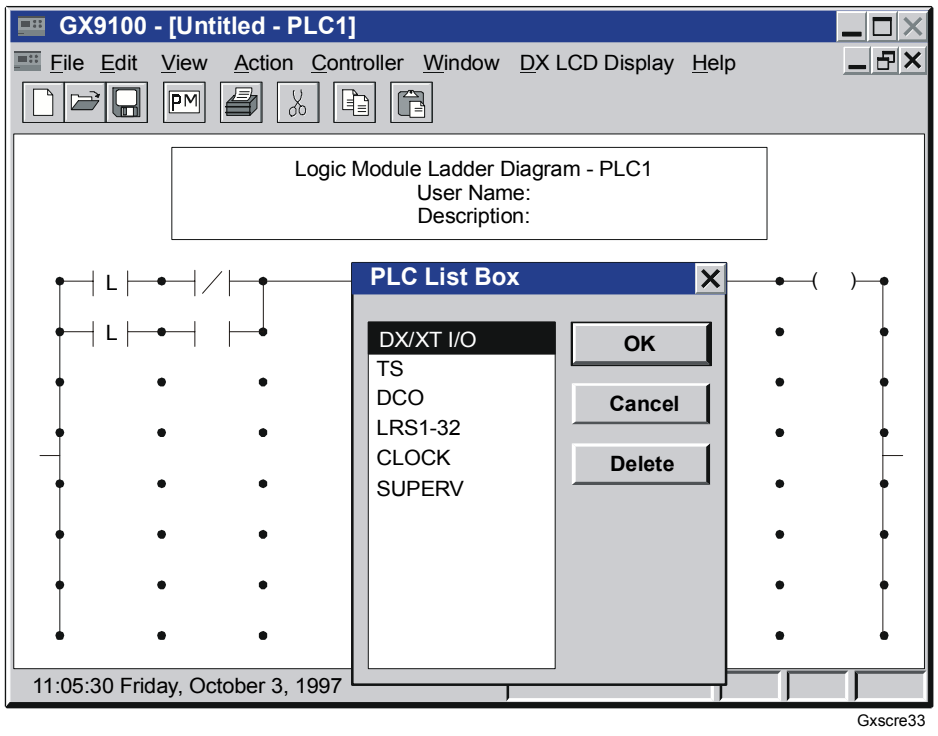


Figure 56: Intermediate Menu for Associated Variables

Note: An option is provided to DELETE an element, but this is only allowed for AND, and AND NOT instructions, because for all other instructions a change in the graphic representation would be necessary.

2. Select a module from the intermediate menu and click OK. For example, if you selected TS from the menu shown in Figure 56, the following dialog box appears:

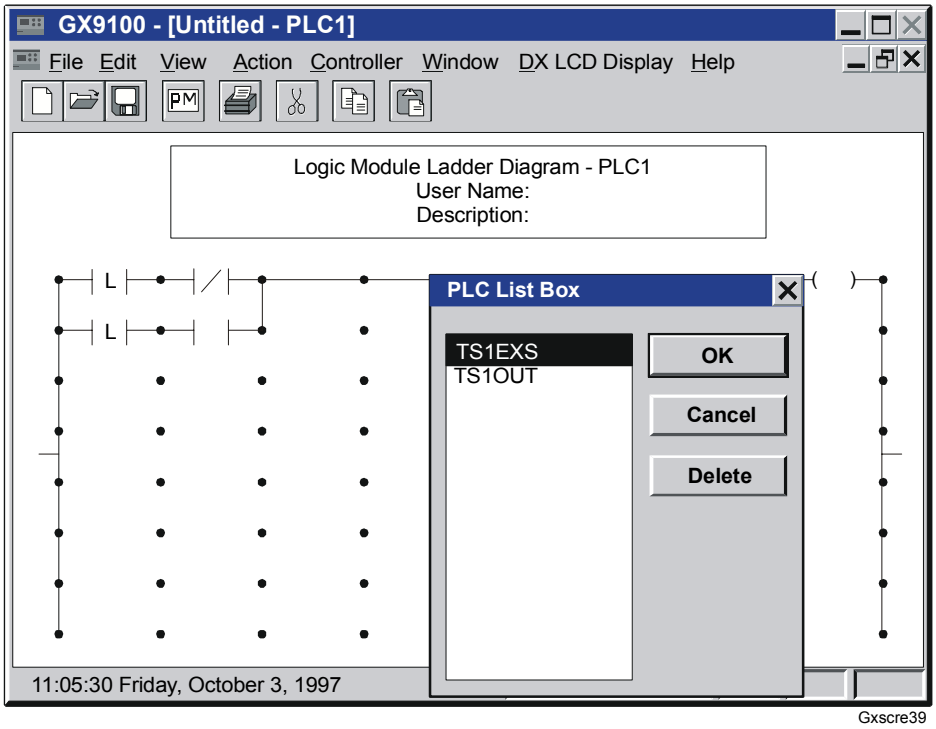


Figure 57: All Logic Variables Under TS

3. Select one of the logic variables and click OK. If you had selected TS1OUT from the screen shown above, the ladder diagram would look like Figure 58.

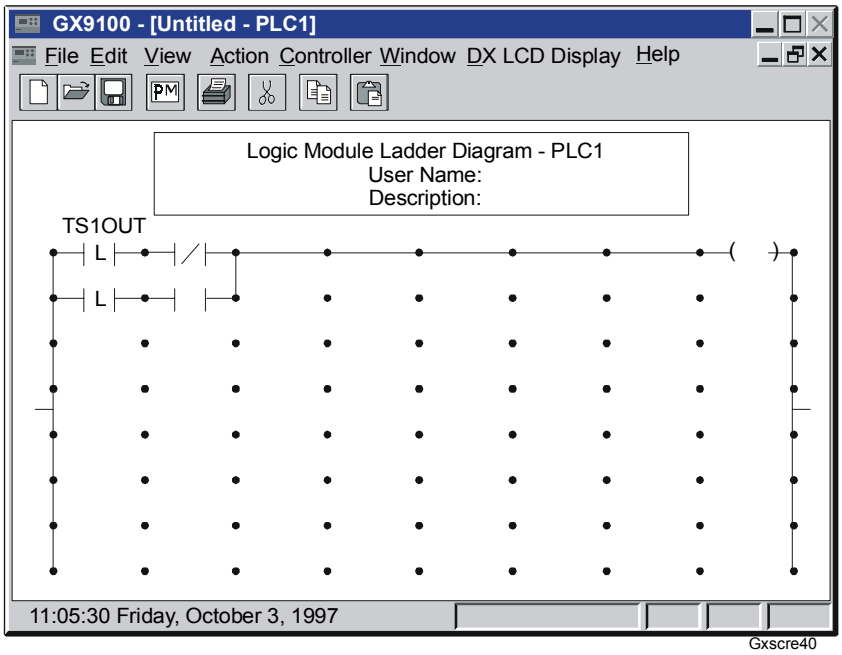


Figure 58: LOAD Symbol with Associated Variable TS1OUT

4. Continue to add associated variables to the remaining logic instructions. When you are finished, your diagram should look similar to Figure 59:

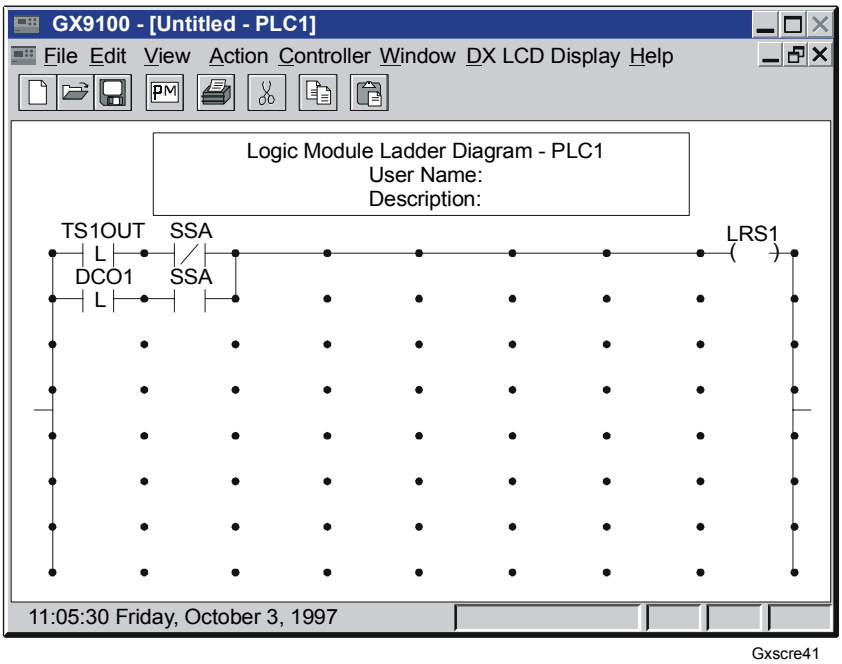


Figure 59: Ladder Diagram with PLC Instructions and Associated Variables

Saving and Exiting the PLC Diagram

To save and exit the PLC diagram:

1. Click on the Save button on the toolbar, or select Save from the File menu, to save the current session in the DX configuration.
2. Double-click on the control box in the upper left corner of the window (or at the left of the menu bar if the window is maximized), or click on the close box in the upper right corner of the window (or at the right of the menu bar if the window is maximized), to leave the PLC ladder diagram and return to the main configuration window.

Connecting and Disconnecting Modules Creating a Configuration

This section describes how to make and remove logical connections between the source and destination points of the various modules.

Connecting Modules

Make connections in the following ways:

- drag from one connection point to another
- use the Connect option
- enter the source point within a data window

Using the Click-Drag Option

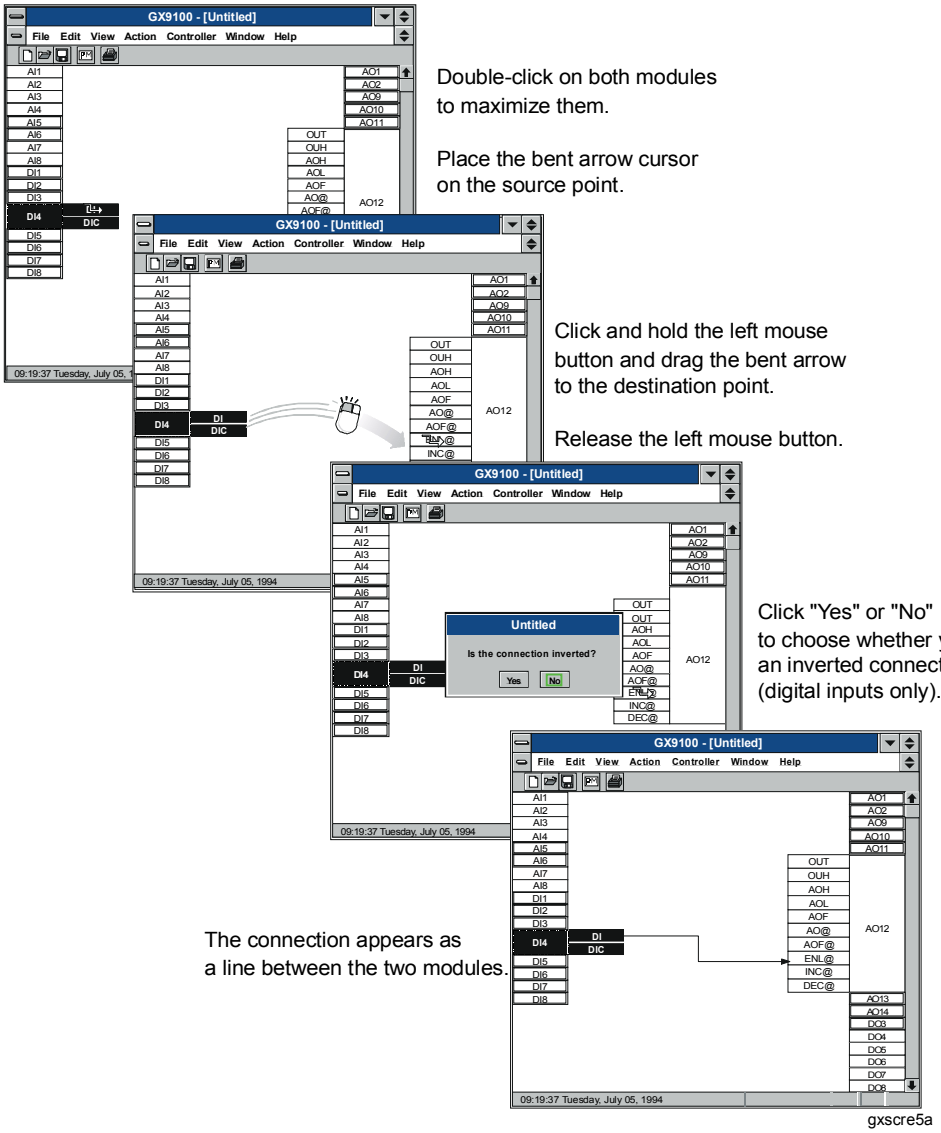

Double-click on both modules to maximize them.
Place the bent arrow cursor on the source point.
Click and hold the left mouse button and drag the bent arrow to the destination point.
Release the left mouse button.
Click "Yes" or "No" to choose whether you want an inverted connection (digital inputs only).
The connection appears as a line between the two modules.
GX9100 - [Untitled]
File Edit View Action Controller Window Help
Untitled
Is the connection inverted?
Yes
No
09:19:37 Tuesday, July 05, 1994
gxscre5a

Figure 60: Using the Click-Drag Method to Make Connections

Using the Connect Option

To use the Connect option:

1. Use the left mouse button to click on the module that contains the source point.
2. Click the right mouse button outside of the highlighted module. The pop-up module menu appears.
3. Select Connect from the module menu.

   Or, select Connect from the Edit menu.

   Or, press F5.

   The Module Connection dialog box appears containing source points for the selected module.

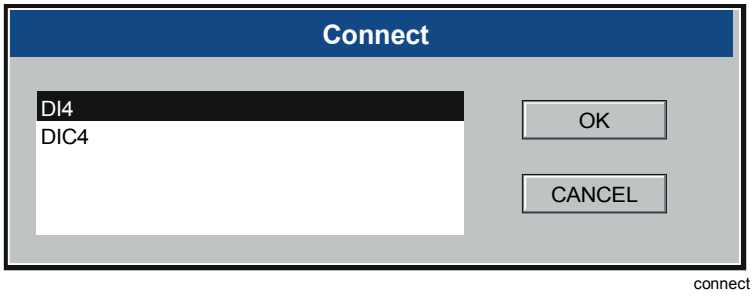


Figure 61: Module Connection Dialog Box

4. Choose a source point, then click OK.
5. Click on the destination module with the left mouse button.
6. Click outside the module with the right mouse button. The pop-up module menu appears.
7. Select Connect from the module menu.

   Or, select Connect from the Edit menu.

   Or, press F5.

   The module connection dialog box appears containing destination points for the selected module.

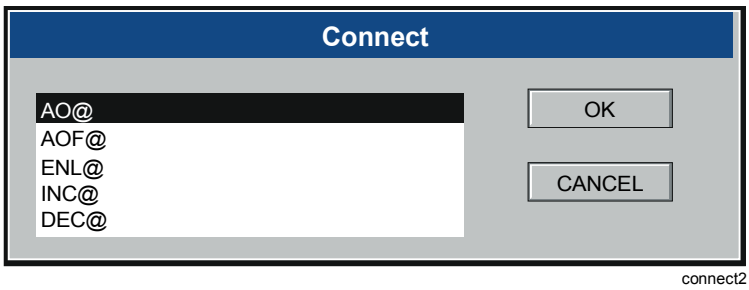


Figure 62: Destination Point Dialog Box

8. Choose a destination point, then click OK. If applicable, a dialog box appears asking if the connection is inverted.

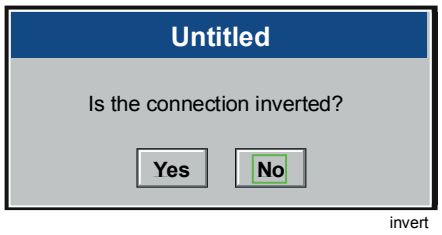


Figure 63: Inverted Connection Dialog Box

9. Click Yes or No. A line appears showing the connection between the two modules.

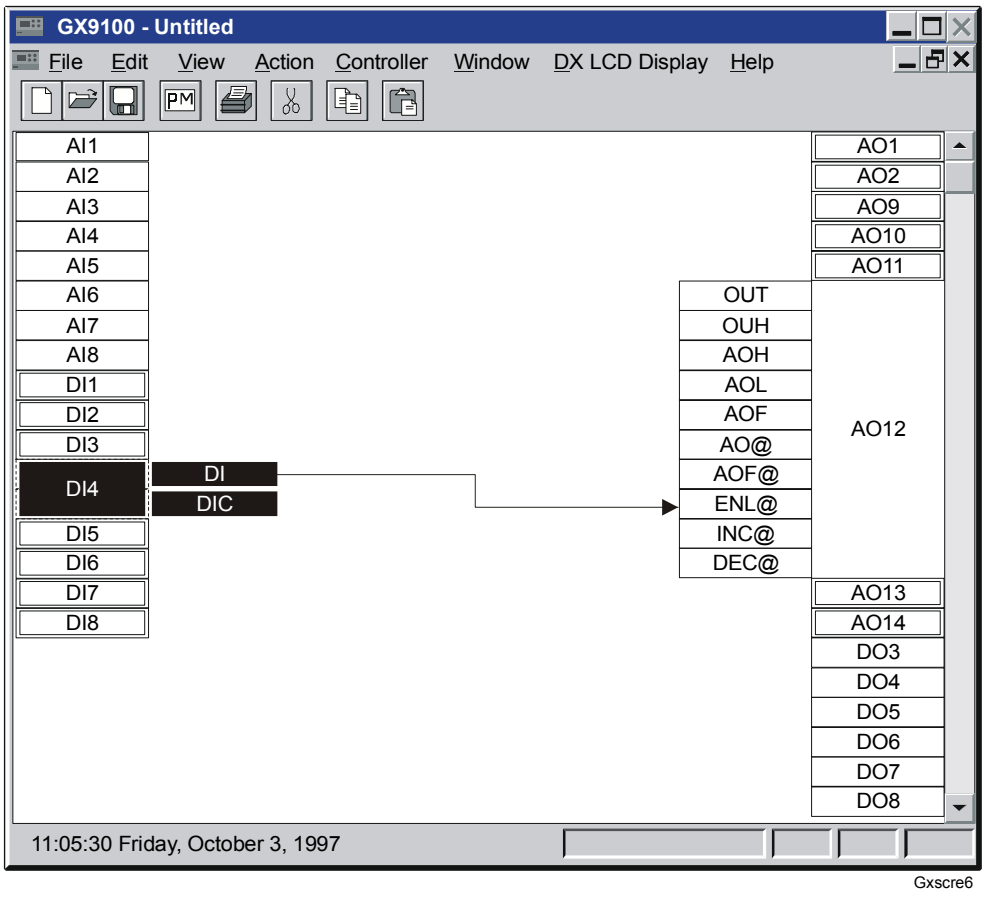


Figure 64: Example--Connected Modules

Note: Once a destination point has been used, it will not appear in the destination point dialog box and new source points will not be able to connect to it. The only way to connect a new source point is to delete the old connection, then define a new one.

Making Connections Within a Data Window

To make a connection within a data window:

1. Use the left mouse button to click on the module that contains the destination point.
2. Click the right mouse button outside of the highlighted module. The pop-up module menu appears.
3. Select Data from the module menu,

   or

   Select Data from the Edit menu.

   The Module Data window appears.

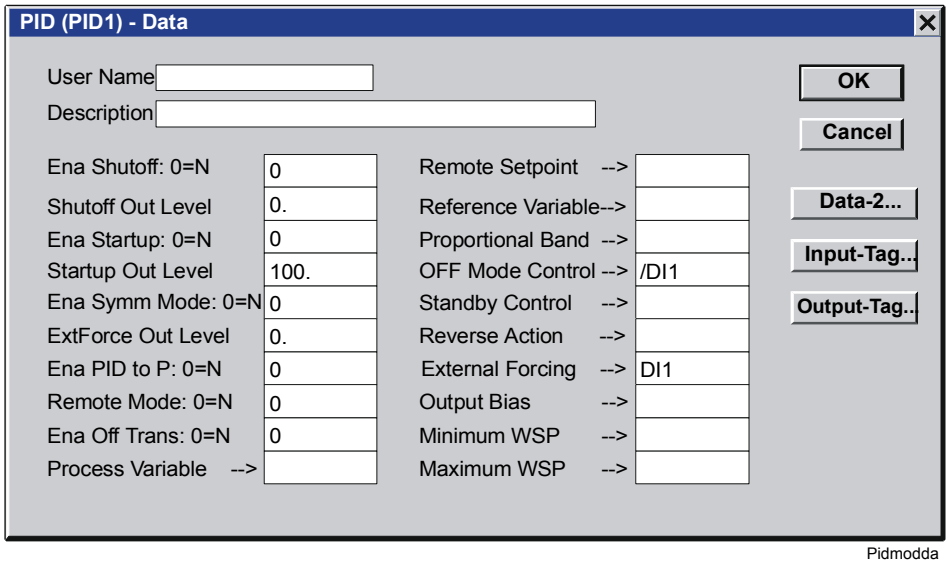


Figure 65: Example Module Data Window

4. Select the data field (box) in the Module Data window corresponding to the desired connection. The blinking cursor appears in the box.

Note: Only descriptions followed by an arrow (→) accept connection information.

5. Type an asterisk (*) in the box. A menu appears, listing the valid configuration modules for the selected field.

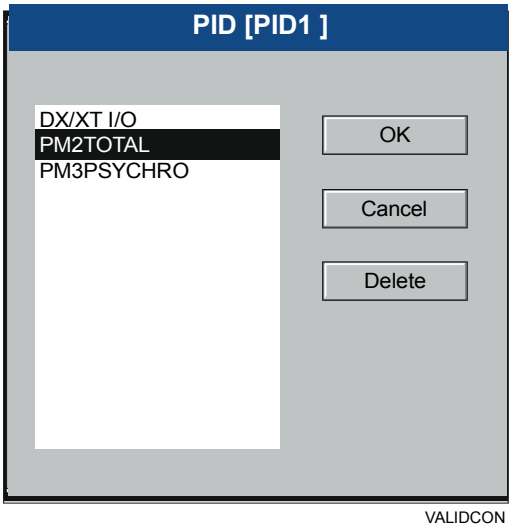


Figure 66: List of Valid Configuration Modules

6. Select one of the valid configuration modules listed by double-clicking on it or by highlighting it and selecting OK.

   A menu of all valid outputs belonging to that module appears.

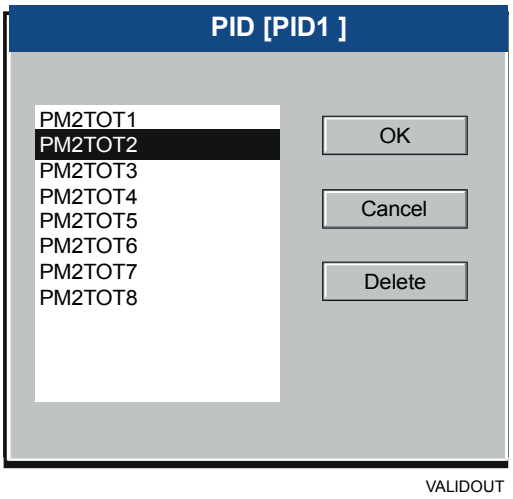


Figure 67: Valid Outputs

7. Select one of the outputs listed by double-clicking on it or by highlighting it and selecting OK.
8. If a logic output is selected, a dialog box appears and asks if you want an inverted connection. Answer appropriately. You are returned to the data window.
9. The name appears in the edit box. A line appears showing the connection between the two modules after exiting the data window.

Disconnecting Modules

To remove a block's current connection, either use the scissors cursor (Figure 68) to cut the connection line at the destination block, or choose the Disconnect option, or delete the connection in the data window.

Using the Scissors Cursor

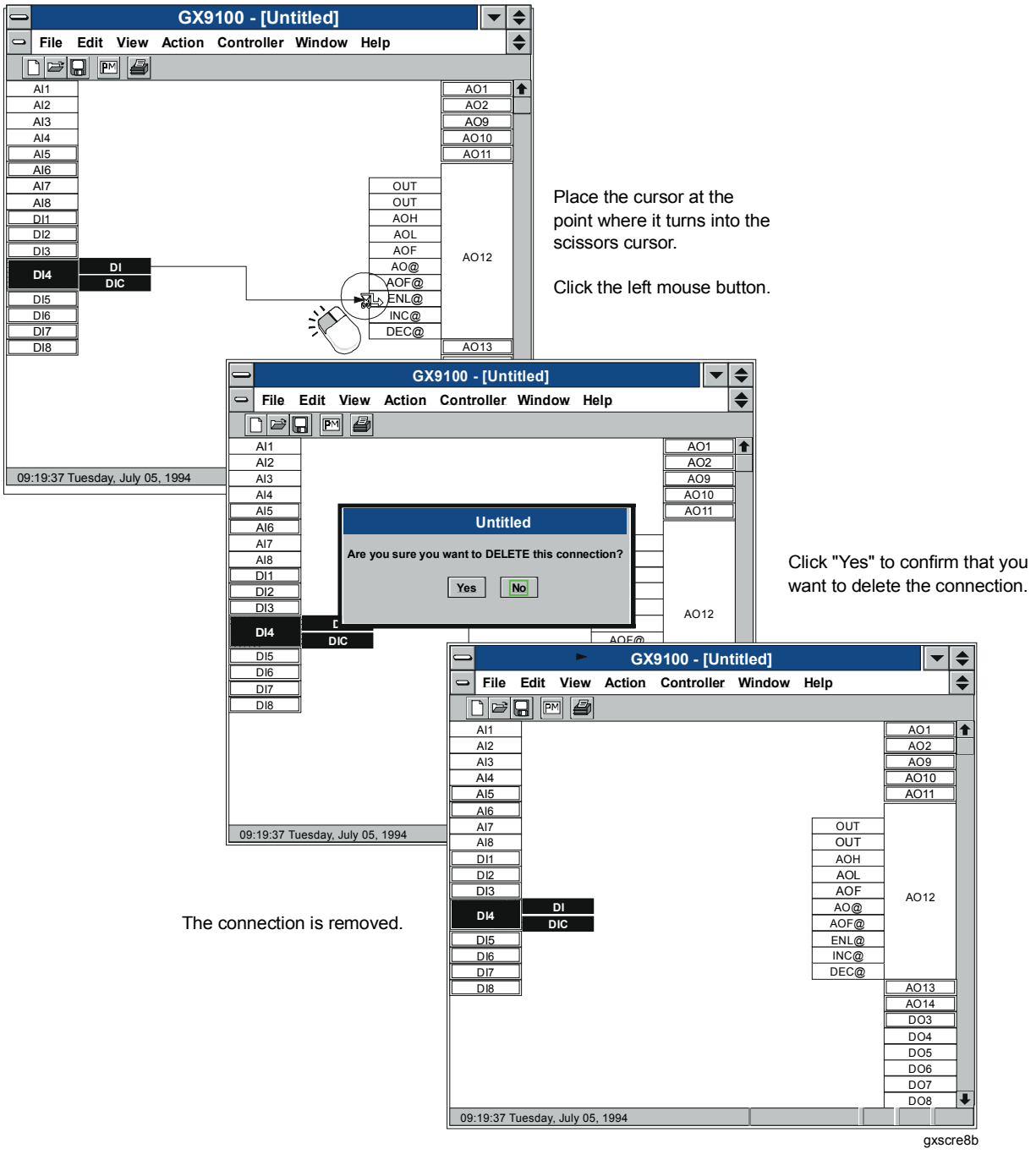

GX9100 - [Untitled]
File Edit View Action Controller Window Help
Place the cursor at the point where it turns into the scissors cursor.
Click the left mouse button.
Untitled
Are you sure you want to DELETE this connection?
Yes
No
Click "Yes" to confirm that you want to delete the connection.
The connection is removed.
09:19:37 Tuesday, July 05, 1994
gxscre8b

Figure 68: Removing the Connection Using the Scissors Cursor

Using the Disconnect Option

To disconnect the modules using the Disconnect option:

1. Click on the destination module with the left mouse button.
2. Click outside the module with the right mouse button. The pop-up module menu will appear.
3. Select Disconnect from the module menu,

   or

   select Disconnect from the Edit menu,

   or

   press F4.

   The Disconnect dialog box appears showing all of the destination points from the selected module that are currently connected.

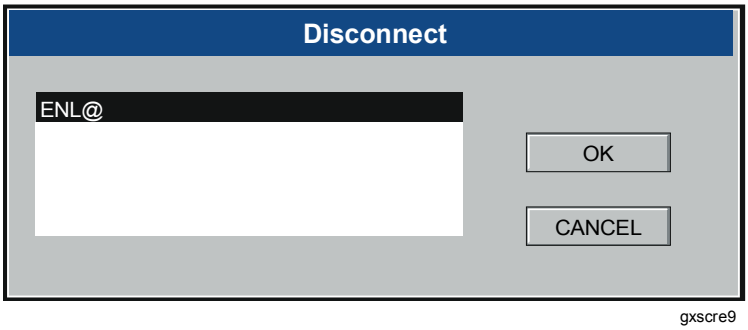


Figure 69: Destination Point Dialog Box

4. Choose the destination point you wish to disconnect, then click OK. A dialog box appears confirming that you want to delete the connection.

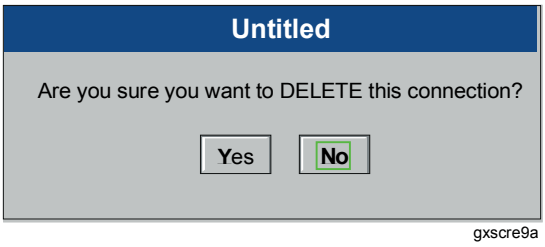


Figure 70: Delete Confirmation Dialog Box

5. Click Yes to confirm the deletion. The connection line is removed from the screen.

Using the Data Window

To disconnect the modules using the data window:

1. Left-click on the module that contains the connection.
2. Right-click outside of the highlighted module. The pop-up module menu appears. Select Data from the module menu,

   or

   select Data from the Edit menu.

   The Module Data window appears.
3. Select (highlight) the entire name in the data field (box) that you want to delete, then press the Delete key,

   or

   select the data field (box) with the connection that you wish to delete, then press the asterisk (*) key.

   A menu appears, listing the valid configuration modules for the selected field. Select the Delete button.

   You are returned to the data window. Press Enter or select the OK button.

Showing Connections

There are three ways to show the module connections in detail:

- Double-clicking connected modules reveals all the source and destination points of that module. Lines will appear between all connected source and destination points.
- Under the data option of the module menu, a data window appears which contains the data for all the destination points and parameters of a module.
- Selecting Show Connections in the View menu brings up a dialog box showing all source point connections for the selected module.

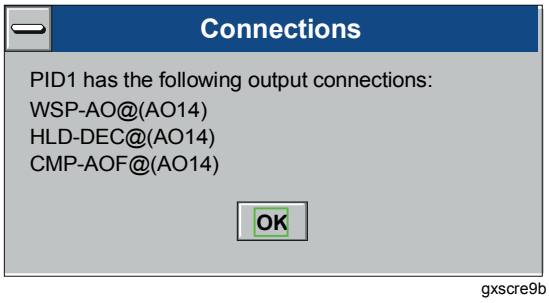


Figure 71: Window Showing Connections

Defining the Trend Log Module (for DX Versions 1.4, 2.4, 3.4, or Later)

The Trend Log module provides 12 trend log channels, each recording data from either one analog item or from a set of 8 logic variables (logic variable byte). The trend can be used to provide data for Metasys Point History in DX controllers that are connected remotely (i.e., via dial-up) to the Metasys system, or for a local DX LCD Display.

Metasys Point History (for DX Versions 1.4, 2.4, 3.4, or Later)

When the DX controller is connected to a Metasys system by an NDM dialer and telephone lines, the trend data may be read whenever a connection is made by the Metasys system. The data is stored in the point history file of AI, AOS, and BI objects when they are mapped to the items being recorded. When the Metasys Point History option is selected for a trend log channel, only those items which can be mapped to Metasys objects are allowed, and the trend parameters are set by the GX-9100 tool to default values for the Point History feature in Metasys.

You must link the Historical Trend Read Request (HTRR) logic variable to the DIAL request logic variable in a PLC module to initiate a dial-up connection when a trend record buffer is full. Since a DX Version 3.x cannot be connected to a Metasys system by the NDM dialer and telephone lines, trend logs cannot be configured for Metasys Point History in these versions.

Configuration for DX LCD Display (for DX Versions 2.4 and 3.4, or Later)

Trend channels that are not used for Metasys Point History are freely configurable. For analog items the sampling rate may be entered and the stored values may be either the average, maximum, or minimum values during the period, or the instantaneous value at the time of reading. Logic variables are recorded with a time and date stamp when there is a change of value. All channels may be displayed on the DX LCD Display.

Adding the Trend Log Module Block

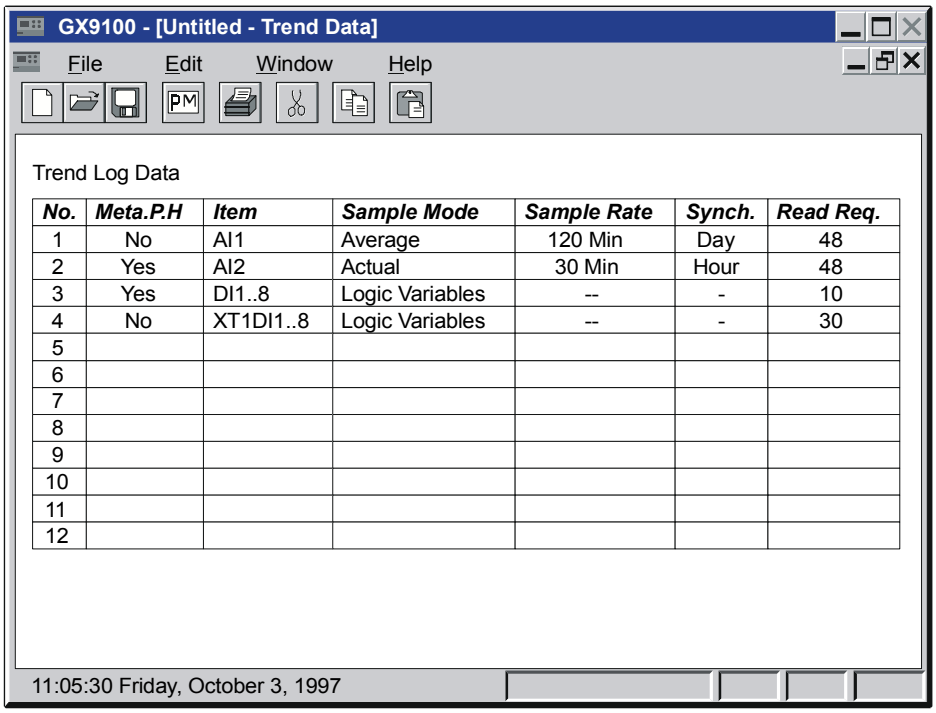
To add the Trend Log module to the configuration:

1. Click on the Add PM button on the toolbar, or select Add PM from the Edit menu.
2. Select Trend from the Add PM menu.
3. Place the Trend Log module block on the screen by dragging it to the appropriate position, then click once to anchor it. You can move the module at any time by clicking and dragging it to a new position on the screen.

Defining the Trend Log Channels

To define the Trend Log module channels:

1. Double-click on the Trend Log module block. The Trend Log Data window opens, as shown in Figure 72.



No.	Meta.P.H	Item	Sample Mode	Sample Rate	Synch.	Read Req.
1	No	AI1	Average	120 Min	Day	48
2	Yes	AI2	Actual	30 Min	Hour	48
3	Yes	DI1..8	Logic Variables	--	-	10
4	No	XT1DI1..8	Logic Variables	--	-	30
5						
6						
7						
8						
9						
10						
11						
12						

Figure 72: Trend Log Data Window

Note: The Trend Log Data table has 12 rows, each defining a channel.

2. Click with the right mouse button on the channel you want to configure and select Data from the pop-up menu that appears; or highlight the channel, then select Data from the Edit menu. The Data dialog box for the Trend Log channel appears, as shown in Figure 73.

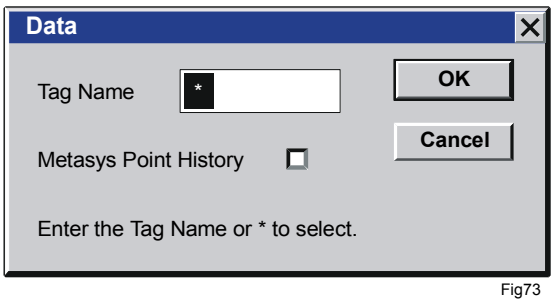


Figure 73: Data Dialog Box for Trend Log Channel

Note: Metasys Point History is grayed-out and cannot be selected for a Version 3.x DX controller because it cannot be monitored remotely with an NDM dialer.

3. Check the Metasys Point History box if required, then enter the desired Tag Name of the item to be recorded. Use an asterisk (*) for the Tag Name to select the item from a list of valid tag names. Click OK to continue to the next dialog box, which depends on what you entered for the Tag Name, as follows:

   - If you entered a specific tag name (e.g., AI1), the next dialog box is the appropriate Trend Data dialog box for the selected item. Skip to Step 7 in this procedure, which describes the Trend Data dialog boxes.
   - If you entered an asterisk (*), then a series of dialog boxes appear that allow you to select from item categories and sub-categories until you find the individual item that you want to add. Continue with the next step (Step 4) in this procedure.

4. If you entered an asterisk (*) in the Tag Name field of the Data dialog box (Figure 73), then a dialog box showing item categories appears, as shown in Figure 74.

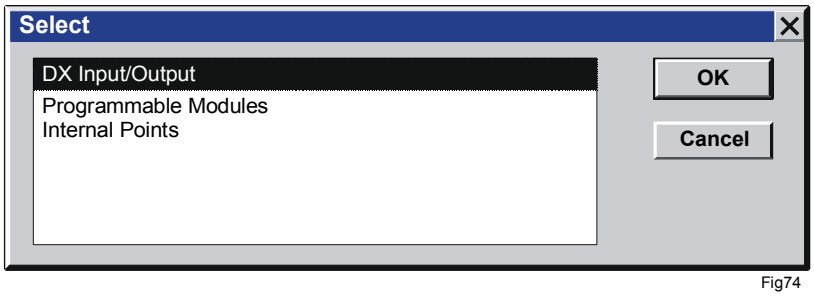


Figure 74: Select Item Category Dialog Box

Note: The categories and items shown in the series of dialog boxes depend on the controller version and whether you selected Metasys Point History.

5. Select a category by double-clicking on it, or by clicking on it to highlight it and then clicking OK. Another dialog box appears listing sub-categories of the category you chose in the previous dialog box. For example, if you chose DX Input/Output in Figure 74, the dialog box shown in Figure 75 appears.

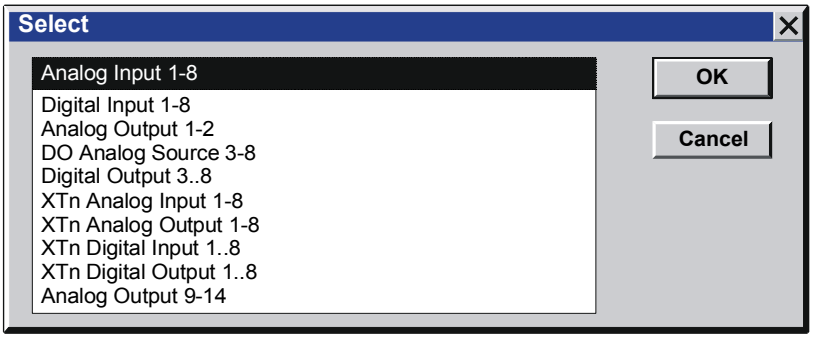


Figure 75: Select Subcategory Dialog Box

6. Select a subcategory by double-clicking on it, or by clicking on it to highlight it and then clicking OK. Another dialog box appears listing either additional sub-categories or individual items. For example, if you chose Analog Input 1-8, as shown in Figure 75, a dialog box listing individual points would appear, as shown in Figure 76.

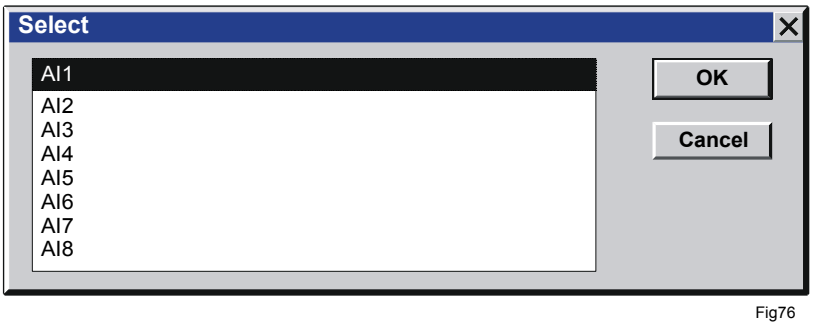


Figure 76: Select Item Dialog Box

Note: There may be several dialog boxes listing sub-categories before you reach the dialog box listing individual items (similar to the one shown in Figure 76). Repeat Step 6 until you find the item you want to add to the table. Refer to *Appendix 3: Trend Log Items* for a list of the tag names available in a Trend Log module.

7. Select the item you want to add to the table by double-clicking on it, or by clicking on it to highlight it and then clicking OK. One of two Trend Data dialog boxes appears, depending on whether you selected an analog item (Figure 78) or logic variable set (Figure 79).

Note: Additional memory points can be saved by using the following procedures:

When selecting a logic variable, choose the byte that contains the required variable. All variables in the set are then available for Metasys Point History or for the DX LCD Display. Since a logic variable set is recorded when any one of its variables changes state, it is recommended that you assign LRS logic variable bytes to the trend log and then connect the source variables (the ones that you wish to trend) to the LRS variables in a PLC module.

For example, if you want to trend TS1OUT, DO1, DO2, BI1, BI2, LRS18, LRS19 and LRS20, the following PLC logic would set LRS1–LRS8 with the values you want to trend.

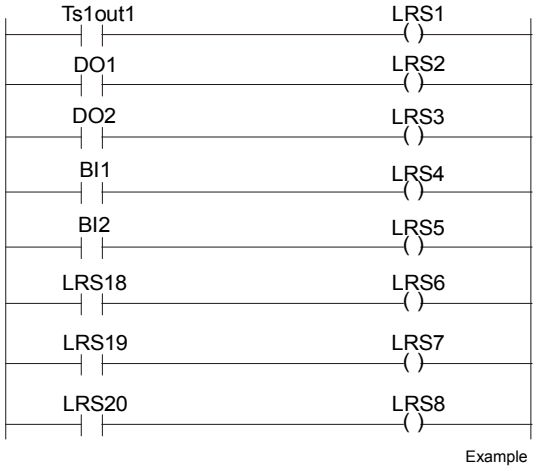


Figure 77: Trend Example

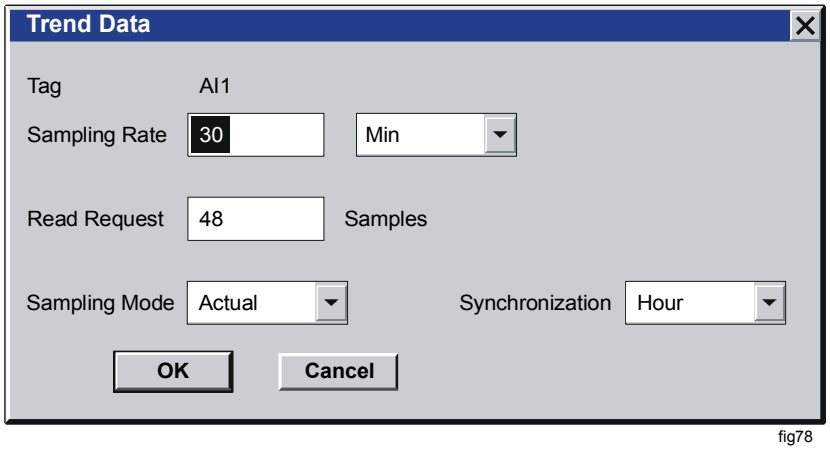


Figure 78: Trend Data Dialog Box for an Analog Item

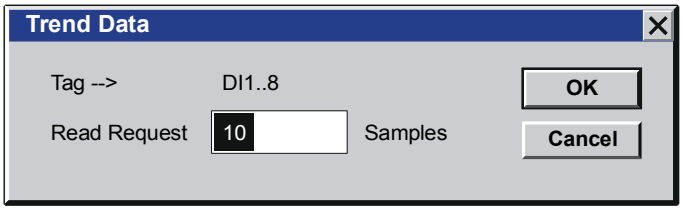


Figure 79: Trend Data Dialog Box for a Logic Variable Set

8. Enter the desired values in the data fields or select from the drop-down list boxes. Table 15 describes the fields, their possible values, and their default values.

Table 15: Trend Data Entries and Options

Dialog Field	Possible Values	Default (= Metasys Point History Setting)
Sampling Rate* (period of time between records)	5, 10, 15, 20, 60 Sec** 1 to 1440 Min	Analog Input: 30 Analog Output: 30
Units for Sampling Rate	Sec (seconds) Min (minutes)	Min
Read Request* (number of new samples to set HTRR)**	Analog: 0 to 61 Logic Variables: 0 to 30	Analog Input: 48 Analog Output: 48 Logic Variables: 10
Sampling Mode (analog value to record at end of each period)	Actual Average Maximum Minimum	Actual
Synchronization (exact time of the start of trend recording)	None Day (midnight 00:00:00) Hour (xx:00:00) Minute (xx:xx:00)	Hour

* Logic Variable bytes are read each second, but only recorded when there has been a change-of-state in at least one bit.

** When seconds are selected, the GX Tool automatically increases the entered value to one of the specified values, and gives an error if the value is over 60.

*** A Read Request value of 0 disables the Read Request feature for the Item or Logic Variable.

Note: If Metasys Point History was checked, the GX-9100 tool sets the trend parameters to appropriate default values and these values cannot be changed.

9. Click on OK to save the channel data and return to the Trend Log definition table.

Saving and Exiting the Trend Log Definition

To save the Trend Log definitions and exit the Trend Log Data window:

1. Click on the Save button in the toolbar, or select Save from the File menu, to save the current session in the DX configuration.
2. Double-click on the control box in the upper left corner of the window (or at the left of the menu bar if the window is maximized), or click on the close box in the upper right corner of the window (or at the right of the menu bar if the window is maximized) to close the Trend Log Data window and return to the main configuration window.

Configuring the DIAL Function for Metasys Point History

In any free line of a PLC module, add a LOAD element assigned to the logic variable HTRR (listed under DIAGNOSTIC), followed by a COS instruction and a SET element assigned to the logic variable DIAL (listed under SUPERV). If other logic variables have already been configured to set the DIAL variable, add the HTRR variable and the COS instruction as an ORB element (OR block) to the ladder diagram. An example is shown in Figure 80.

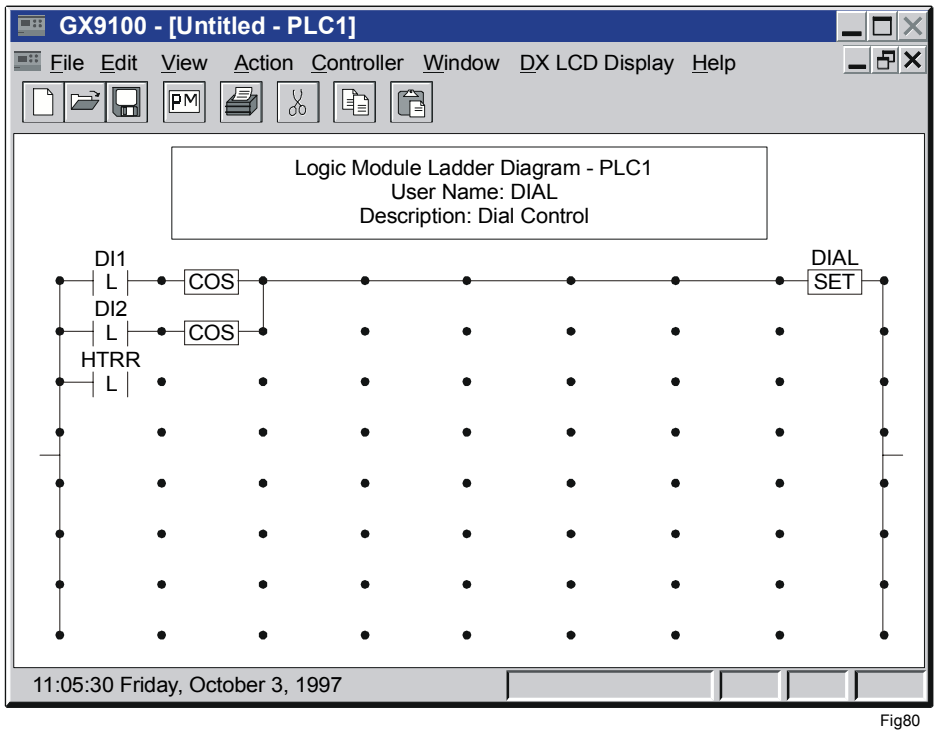


Figure 80: Ladder Logic to Set DIAL from Trend Log

For more information on this application, refer to *the DX-9100 Configuration Guide* or the *NDM Configurator Application Note* in *FAN 636.4 or FAN 1628.4.*

Saving the Configuration

To save a GX-9100 configuration, click the Save button on the toolbar or select Save from the File menu. The configuration will save under the current file name.

Note: If you save a configuration while in Show Selected mode, the entire configuration does save. However, the next time you open the saved file, you will only see the selected view. To see entire configuration, select Show All from the View menu.

If you are saving the configuration for the first time, the following window displays:

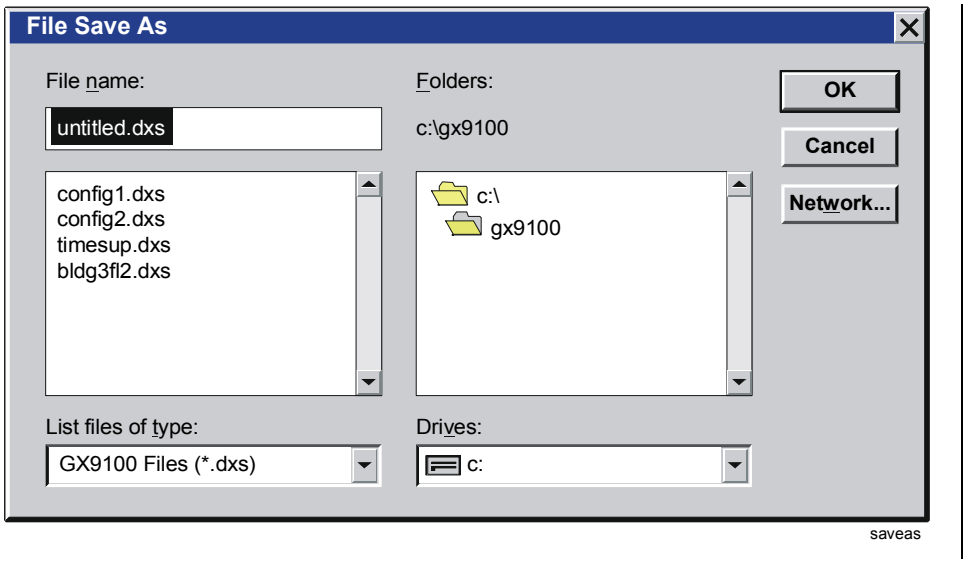


Figure 81: File Save As Window

To save a GX-9100 configuration under a different file name, select Save As from the File menu. Type in the new file name, and click OK. The configuration will be saved under the new name.

Downloading to a DX Controller

To download the configuration to the DX controller:

Select Download from the Action menu. The following dialog box appears:

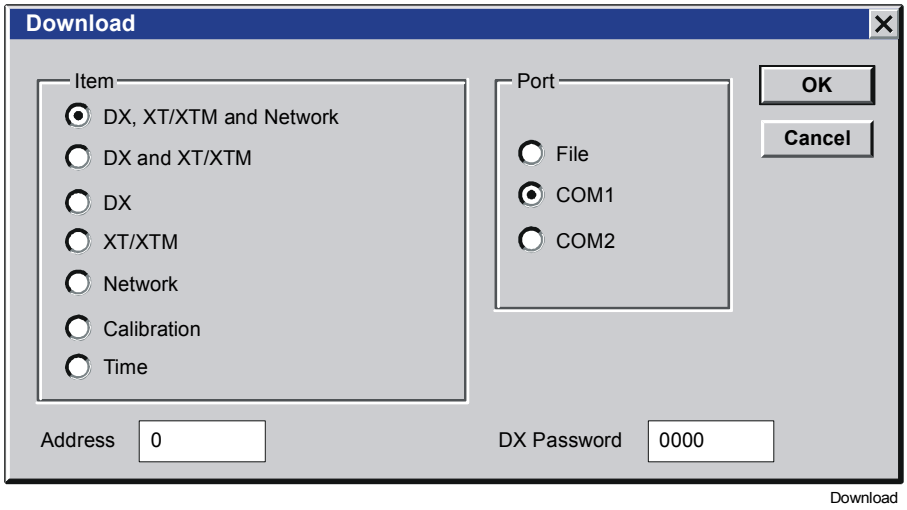


Figure 82: Download Dialog Box

1. Select the item you want to download it to and the Port you want to use for the download by clicking the radio buttons.

   Note: If downloading from the OWS, the port selected must be File. This creates a file with a `.DXF` extension. You can move the file from the GX-9100 directory (or from whatever directory it is in) to the Metasys directory under the System91 subdirectory. This is the default directory. Then it can be downloaded from a DX-9100 Device Object Focus window in the OWS. You can also download from any directory by typing in the full path in the Device Object focus download screen.

2. Enter the address of the controller in the Address data field to download the configuration. The address must be a number between 1 and 255. The address must be correct, even if saved to a file, since the OWS checks that the program address matches the DX address. If you selected XT/XTM as the item to be downloaded, no address is required (it is already stored in the configuration), and the Address field is grayed and cannot be selected.

   Note: If connected to the DX, the XT/XTM cannot be downloaded individually from the OWS.

3. For DX Versions 1.4, 2.4, 3.4, or later only: If the DX controller already has a configuration with a password, enter the number in the DX Password field. The download fails if the password number is incorrect.

   Note: If the global data password in the configuration being downloaded is different from the password in the controller, the password is changed in the controller. Also, the DX Password field only appears if the password protection feature is enabled in the `GX9100.INI` file (see *Enabling Password Protection for the DX-9100 Download/Upload Dialogs (DX Version 1.4, 2.4, or 3.4)* under *Software Installation* at the beginning of this guide).

4. Click on OK. The hourglass appears on the screen until the configuration has downloaded.

Viewing Configurations

Show Selected

If your configuration is very complex, for clarity you may want to view only certain points and modules. To do this:

1. Select the points and modules you want to view by clicking on them while holding down the Ctrl key. (This allows you to select more than one point or module at a time.)
2. Select Show Selected from the View menu.
3. To see all points and modules on the screen, select Show All from the View menu.

Trace

The Trace feature makes all lines (connections) invisible except those connected to a selected module. This allows you to easily trace a path without other connections in the way.

The following figure shows how the screen will look before using the Trace feature:

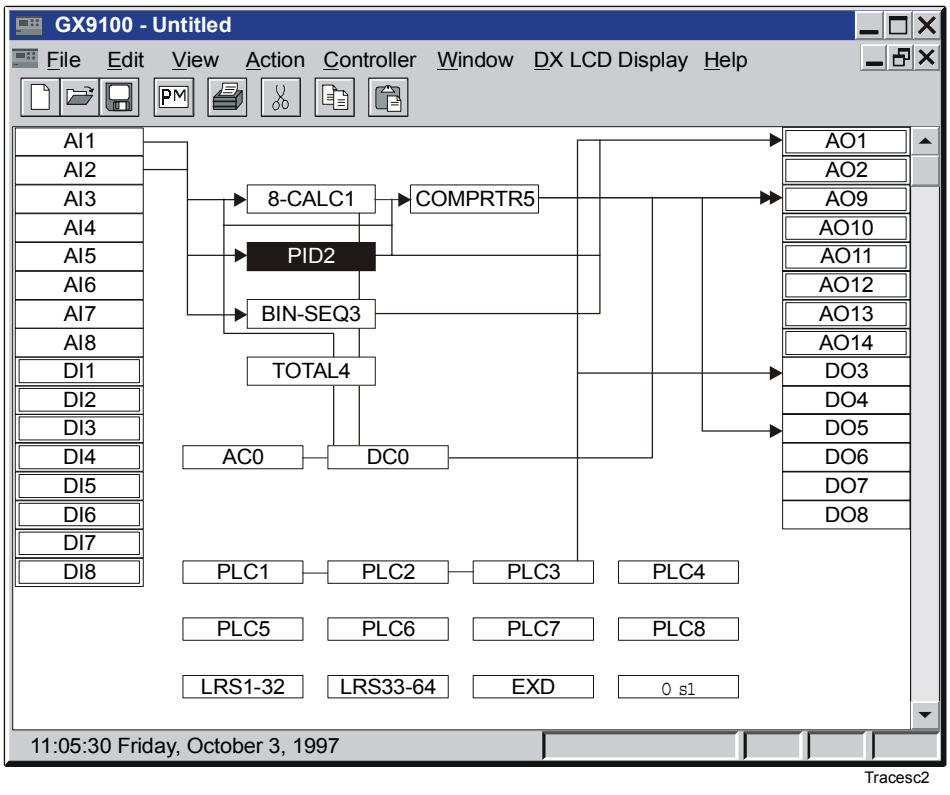


Figure 83: Before Trace Example

Follow these steps to trace the connections for the PID2 module:

1. First select the module that you wish to trace by clicking on it.
2. Select Trace from the View pull-down menu. All connections become invisible except for the connections of the selected module. The connections for that module remain visible for easy tracing.

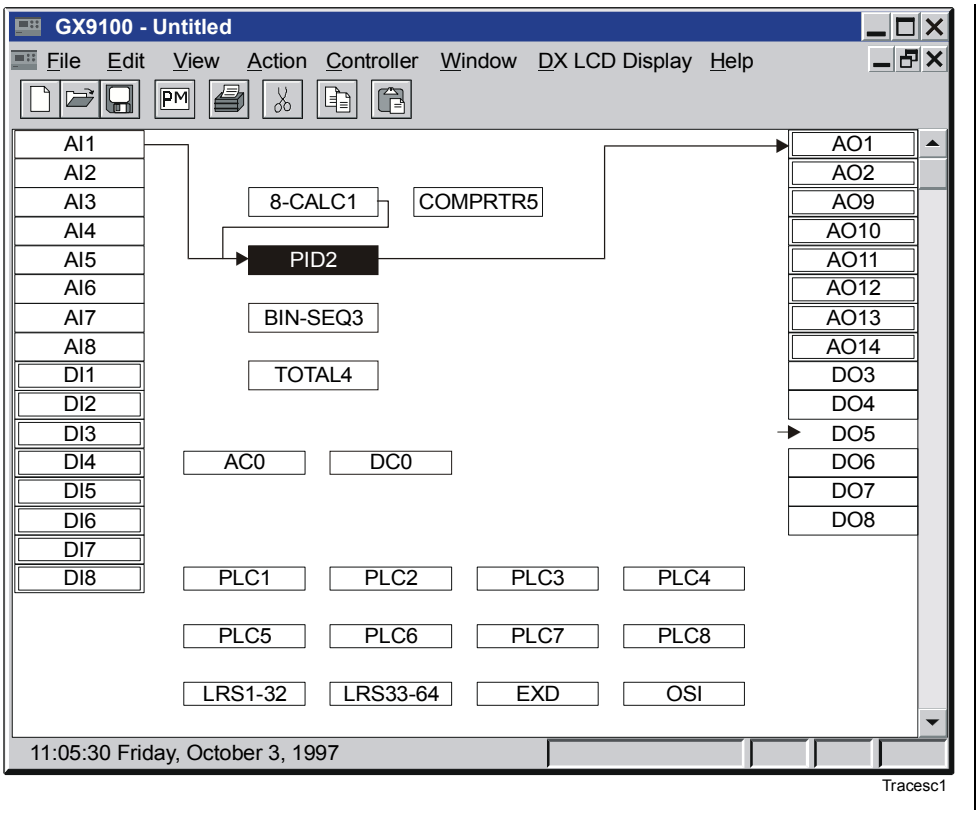


Figure 84: Module Selected for Easy Tracing

3. To trace the connections path for another module, simply click on another module. To trace multiple modules at the same time, use Ctrl-click on each subsequent module.
4. To turn off the Trace function, simply select Trace from the View pull-down menu again.

Show User Names

If you have defined user names for the configuration, you may want to view those names rather than the predefined point and module tags. To do this, select Show User Names from the View menu. To return to viewing point and module tags, select Show Tag Names from the View menu.

Setting Up Header and Footer Options

To set up headers and footers for printing configurations:

1. Select Header/Footer from the File pull-down menu. The Header/Footer dialog box appears.

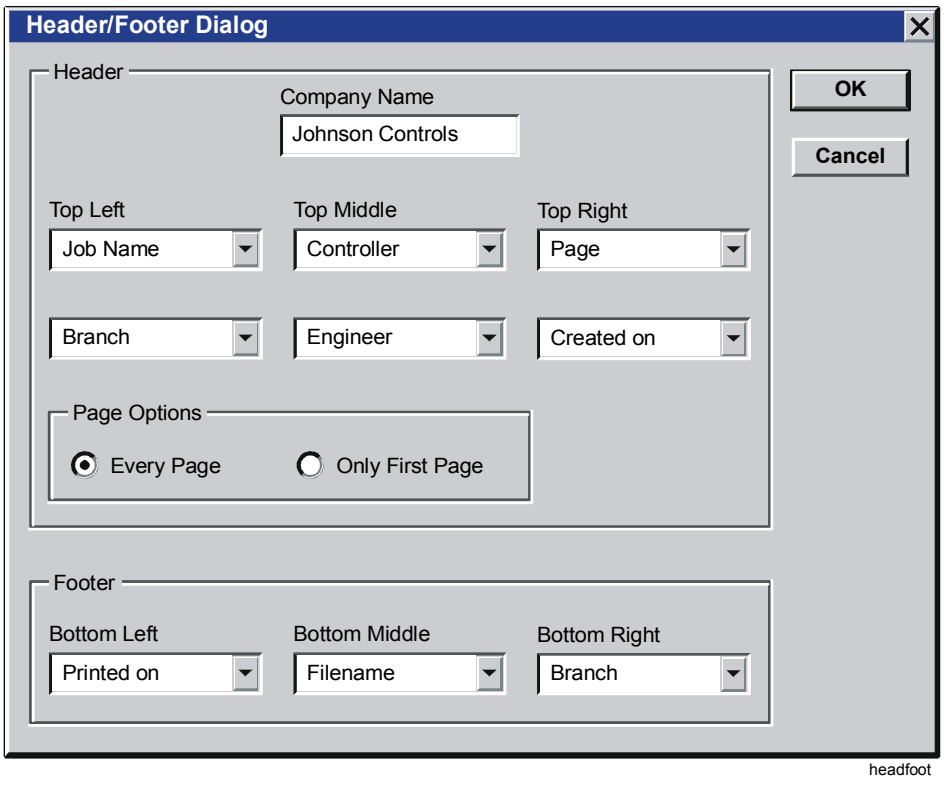


Figure 85: Header/Footer Dialog Box

2. Fill in the Company Name edit box.
3. Select the desired field positions for the header and footer using the drop-down lists. The information for Job Name, Controller Name, Engineer, Branch, and Created on is entered in the Job Information screen. Refer to *Defining Job Information* in this document.

4. An example of the header and footer styles is shown below.

   Note that a new configuration has default settings. The default Company Name is Johnson Controls. The default position for each header/footer field is shown in the example below.

   The header includes descriptors, like **JOB NAME:**, but the footer does not.

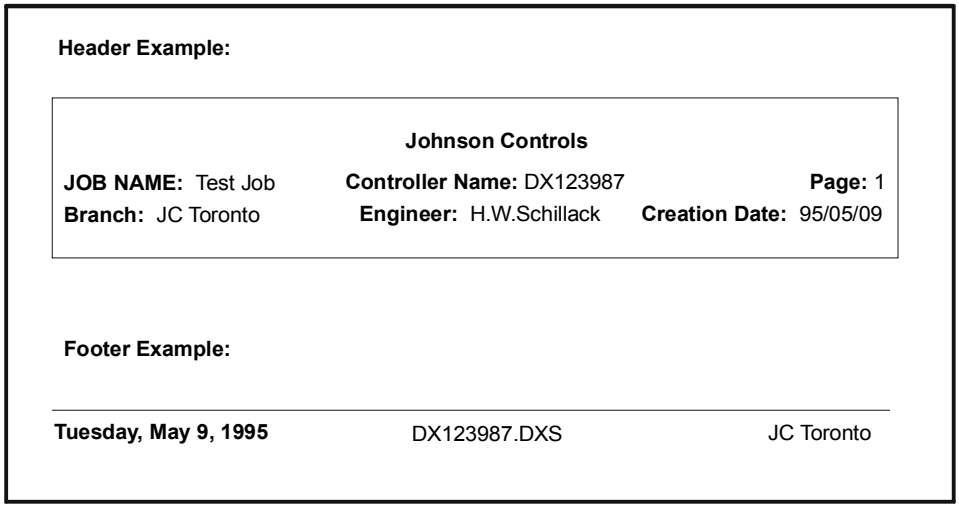


Figure 86: Header and Footer Example

5. Select whether the header should appear on every page or only the first page by selecting the appropriate radio button (Figure 85).
6. Select OK if you are satisfied with the format, or Cancel to revert to the default settings.

Previewing the Printed Configuration

To view how the configuration will look when printed:

1. Select Print Preview from the File menu. The following dialog box appears:

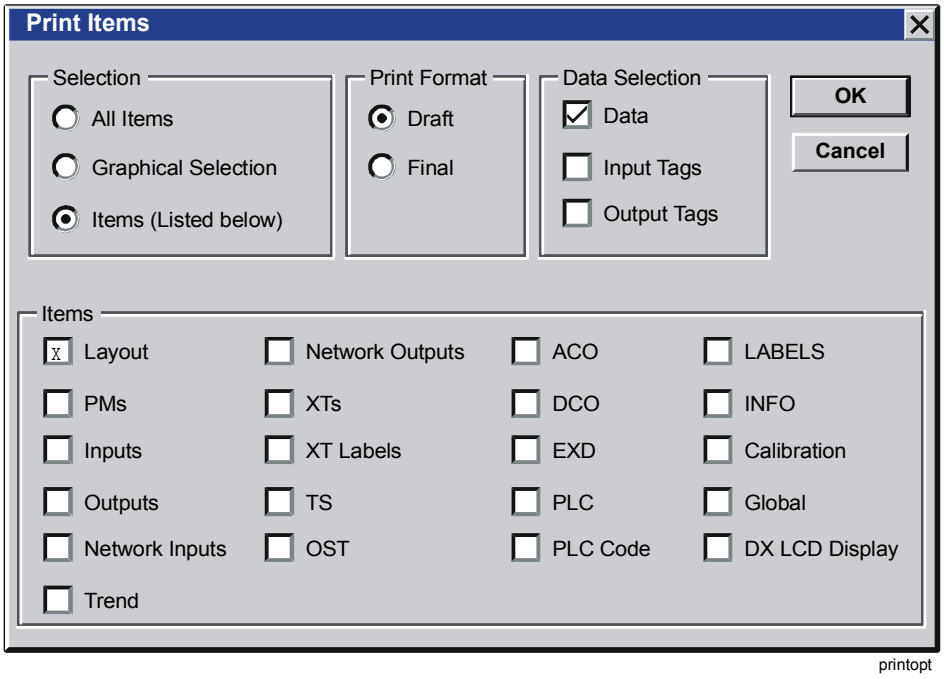


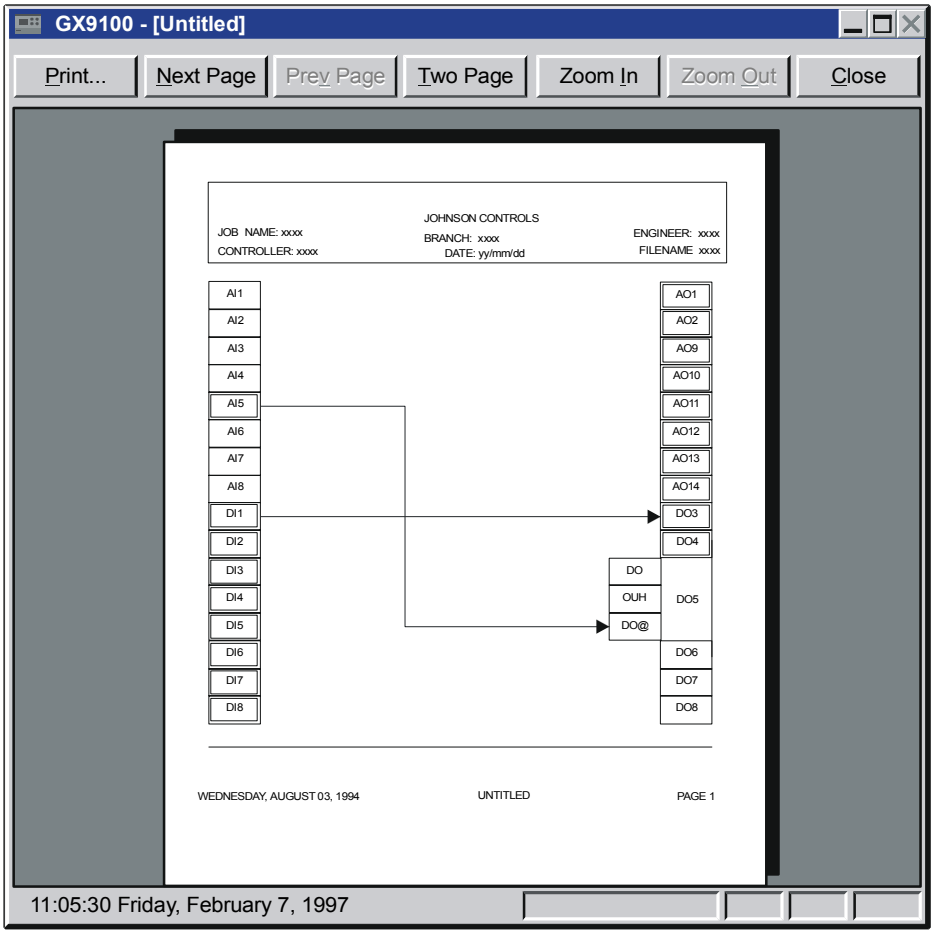
Figure 87: Print Options

2. Select the options you want to preview by clicking on the radio buttons and check boxes. Table 16 describes some of the options in this dialog box.

Table 16: Print Options

Option	Description
Selection (You may select only one of the following.)	
All Items	Prints items listed in the Items box, including module data, job information, calibration information, and global data.
Graphic Selection	Prints all items selected in the configuration layout.
Items (Listed below)	Prints all items with checked boxes in the Items box.
Print Format (You may select only one of the following.)	
Draft	Prints the configuration as it would be printed in draft mode (without page headers and footers).
Final	Prints the configuration as it would be printed in final mode (with page headers and footers).
Data Selection (You may select more than one of the following.)	
Data	Includes data for every module with the configuration printout.
Input Tags	Includes a list of defined input-tags for every module with the configuration printout.
Output Tags	Includes a list of defined output-tags for every module with the configuration printout.

3. Click OK. A screen similar to the following appears:



gxprint

Figure 88: Print Preview

4. The page on the screen looks exactly like the printed document. You can zoom in to view half- and quarter-page views by clicking the Zoom In button. Click the Zoom Out button until you return to the full page view. To view two pages at a time, click the Two Page button. To return to the one-page view, click One Page. To view pages not displayed on the screen, click Next Page or Prev Page, or use the scroll bar.
5. If you decide you do not want to print the configuration at this time, click Close.

   If you decide to print the document, click Print. This will bring you to Step 3 in the regular *Print Sequence* section.

Print Sequence

To print a configuration:

1. Click the Print button on the toolbar, or select Print from the File menu. The following dialog box appears:

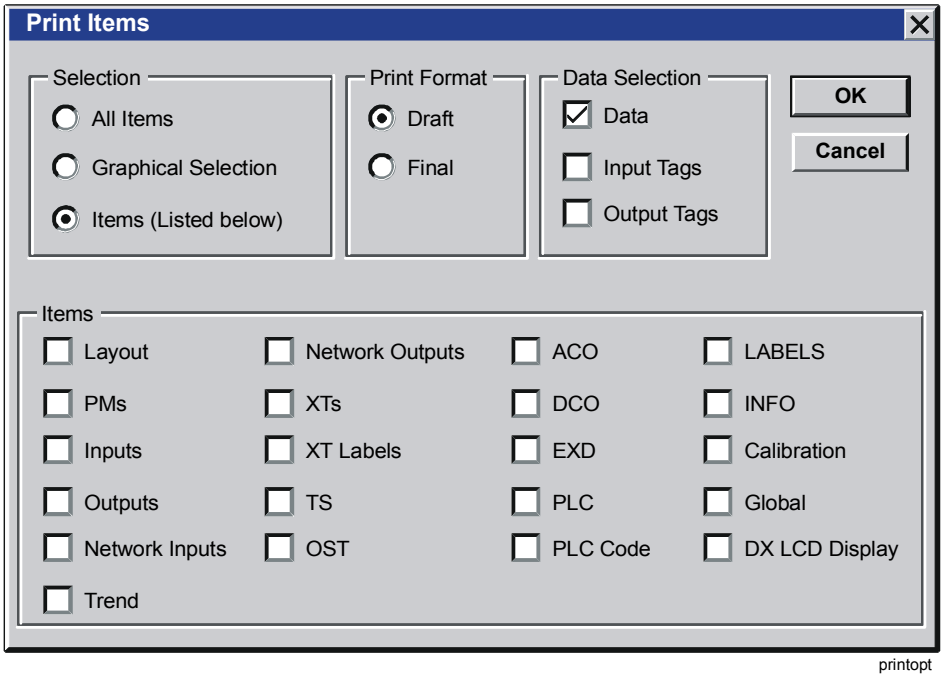


Figure 89: Print Options Dialog Box

2. Select the print options you want (Table 16) and click OK. The following dialog box appears:

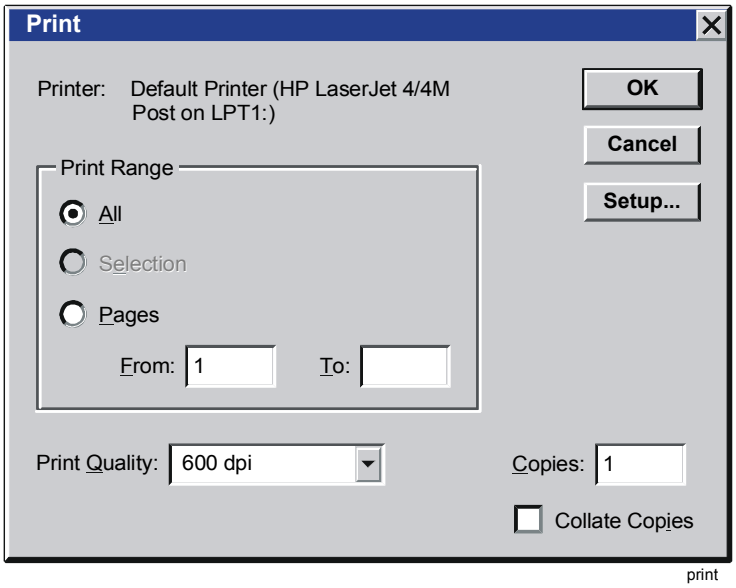


Figure 90: Print Dialog Box

3. Choose the print range by clicking on one of the radio buttons.

   Note: If you choose Page, you also need to enter the starting and ending page numbers in the From: and To: data fields.

4. Select the print quality from the drop-down list. A higher DPI (Dots Per Inch) number equals a better, but slower, printed copy.

5. Enter the number of copies you want in the Copies: data field. If you're printing more than one copy, and you want each set of pages to print out in order, check the Collate Copies box.

6. If you need to change printer options, click the Setup button. Otherwise, click OK to print your configuration.

Creating Tag Name ASCII Files

The tag name file allows the user to create an ASCII text file for the current GX-9100 tool configuration file. This file can be modified offline using any text editor, and read back into any configuration file. The information contained in the tag file is job information, user name, description, and input and output tags for each defined input, output, and program module. In situations where multiple similar controller applications exist, it reduces the amount of repetitive typing by modifying and reusing a single file. To do this, use the Read User Names and Write User Names menu options in the File pull-down menu as described in the following section.

Write User Names

Once you have defined a configuration, all tags, and user-defined names, create an ASCII (text) file containing all tags and user names for that configuration:

1. While in the configuration from which you want to make the tag file, select Write User Names from the File pull-down menu. A Tag Name dialog box appears similar to the one below.

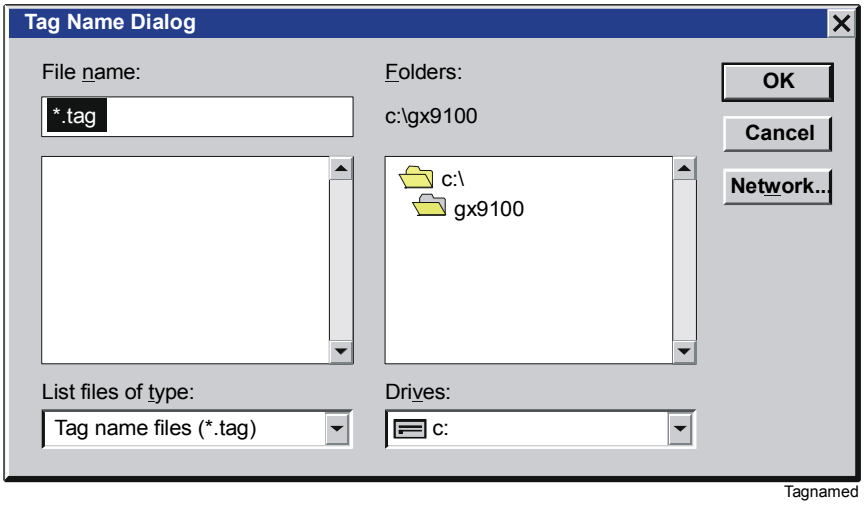


Figure 91: Tag Name Dialog Box (Write User Names)

2. Replace the asterisk (*) in the File Name box with the name you wish to give the .tag file.
3. Use standard Windows methods to select the drive and directory where you wish to place the file.

   The Network button only appears if you are on a network. If you need to change to a different server, select the Network button. The Network - Drive Connections dialog box appears. If you need additional assistance concerning using this screen, consult with your network administrator.
4. Select OK to save it.
5. The new .tag file can now be edited using any text editor and/or imported into another configuration as defined in the *Read User Names* section. A partial example of a typical .tag file is shown here. Following the equal signs (=), you can insert user-defined names. The names you enter become the User Names for the appropriate tags in the new configuration. Project Descriptions are limited to 50 characters per line. Tag names are limited to 8 characters, and tag descriptions are limited to 24 characters per line.

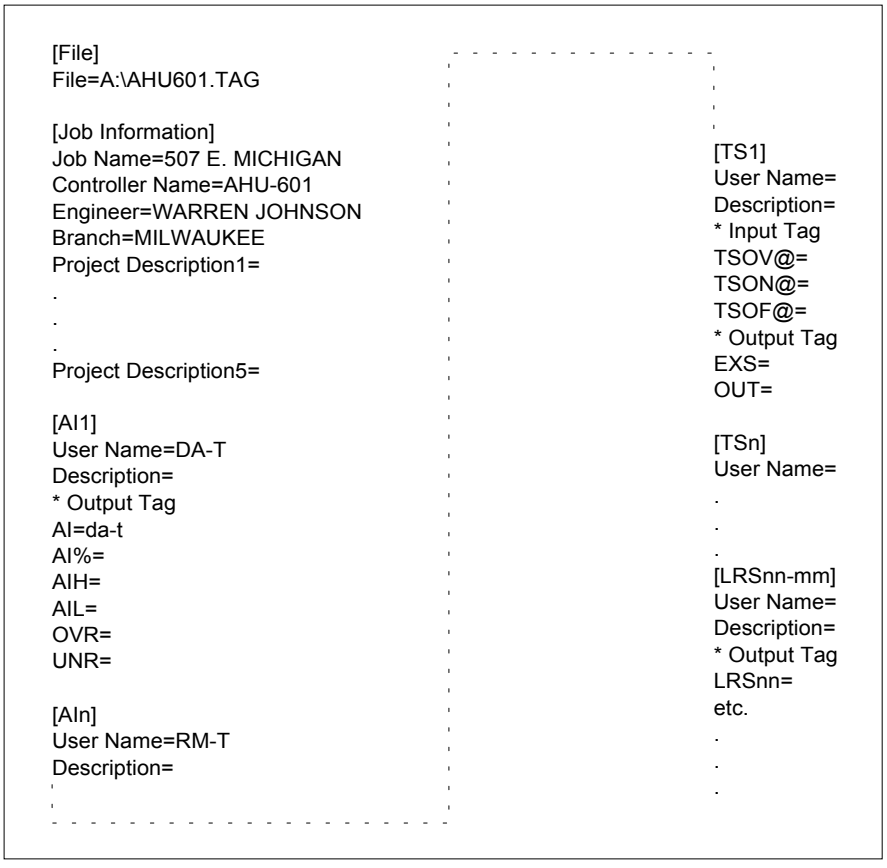


Figure 92: Partial Example of a Typical .TAG File

Read User Names

Follow the instructions below to import the Tags and User Names into a configuration from a .tag file created from Write User Names.

1. From within the configuration into which you want to import the tag file, select Read User Names from the File pull-down menu. A Tag Name dialog box appears similar to the one below.

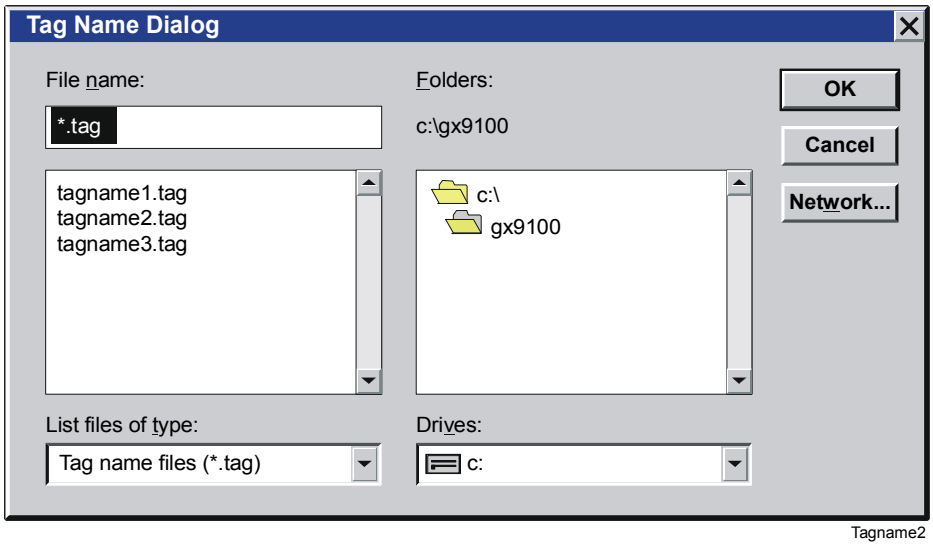


Figure 93: Tag Name Dialog Box (Read User Names)

2. Use standard Windows methods to select the drive and directory containing the file.

   If you need to change servers, select the Network button. The Network - Drive Connections dialog box appears.

3. Select the desired tag file from the list in the left side box. Select OK. The tag and user-defined names are imported into the open configuration.

Note: The user names change for the matching modules only.

Creating DDL Files

When the configuration is saved, two DDL files are also created. One has the extension `.DMO` and is a DDL Model File for mapping CS objects. This file is also used for Template Commissioning in HVACPRO. The other file has an extension of `.DNC` and is an NC DDL file with the hardware items AIn, DIn, AOn, and DOn mapped to appropriate Metasys objects.

To select the items to be included in the DDL files:

1. Select DDL File Options from the File menu. The DDL File dialog box (Figure 94) appears.

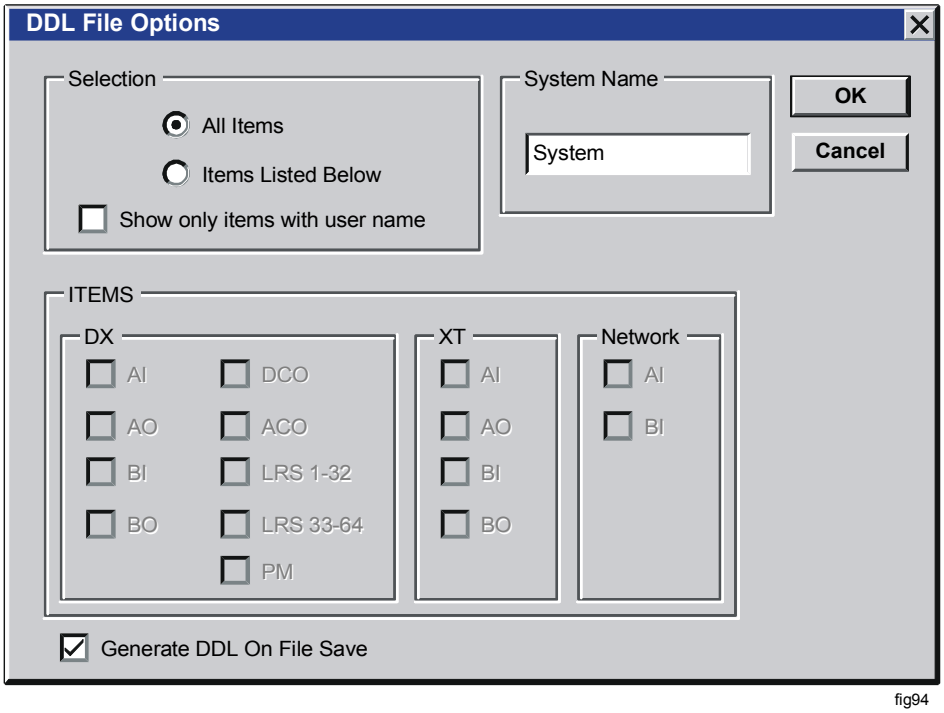


Figure 94: DDL File Options Dialog Box

2. Select All Items or Items Listed Below by clicking on the radio buttons. If you select Items Listed Below, the items in the ITEMS box are enabled and can be selected. Select those items that you want to be included in the DDL files by clicking on their check boxes. The items can be further limited by checking the box "Show only items with user name."
3. Enter the desired 8-character Metasys System Name.
4. By default, the DDL files are generated when you save the controller configuration. To disable the generation of DDL files, click on Generate DDL On File Save to remove the check mark.
5. Click on OK to save your selection.

Modifying Configurations

You can access an existing configuration in two ways:

- Upload an existing configuration from the controller.
- Open a previously saved configuration file.

Uploading a Configuration from the Controller

To upload a configuration from the controller:

1. Select Upload from the Action menu. The Upload dialog box appears (Figure 95).

Note: If upload is selected while PLC, Trend or DX Display definition windows are open, an error is displayed. Close all PLC windows associated with the current configuration. Close the Trend window or DX LCD Display definition window. Try again.

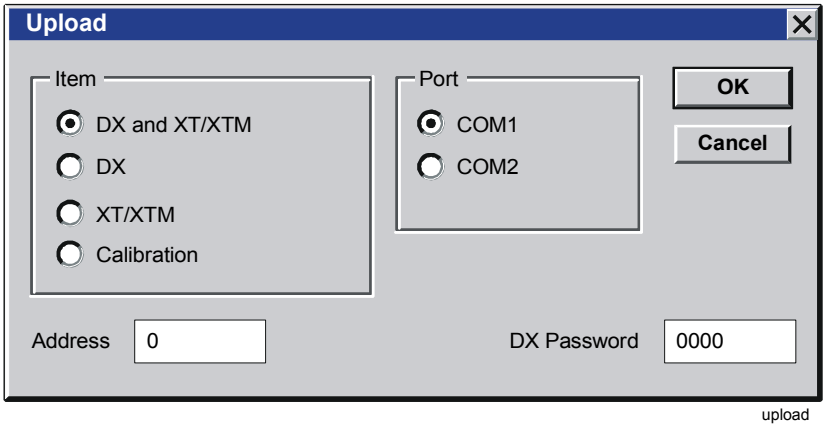


Figure 95: Upload Dialog Box

2. Select the item you would like to upload and the port to which the DX controller is connected by clicking on the radio buttons.
3. For DX Versions 1.4, 2.4, 3.4, or later only: Enter the password number of the configuration you are uploading in the DX Password field. The upload fails if the password number is incorrect.

Note: The DX Password field only appears if the password protection feature is enabled in the `GX9100.INI` file (see *Enabling Password Protection for the DX-9100 Download/Upload Dialogs (DX Version 1.4, 2.4, or 3.4)* under *Software Installation* at the beginning of this document).

4. Click on OK. Upload first checks whether the configuration in the tool matches the configuration in the controller (unless you are uploading a calibration). Upload DX checks only for DX elements and upload XT/XTM checks against XT1/XTM1 and its associated EXPs, if applicable. Upload DX and XT/XTM checks both.

5. If the check fails, the following dialog box appears:

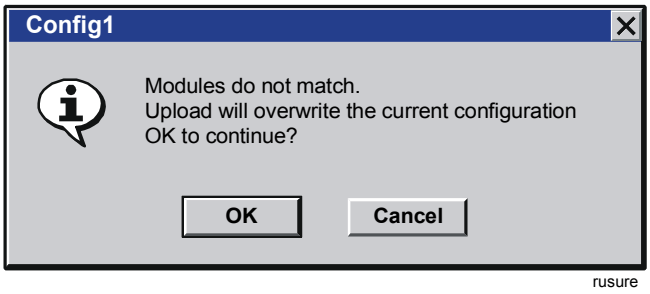


Figure 96: Creating New Configuration

6. Select OK to continue uploading the configuration. The configuration will display on the screen when the upload is completed.

Note: It is recommended that you save the current configuration before uploading as the current configuration on the screen will be replaced by the configuration uploaded from the controller.

Opening a Configuration File

If you have created and saved configurations before, you can open the saved files and modify them. To open a previously saved file:

1. Click on the Open button in the toolbar, or select Open from the File menu. The following dialog box appears:

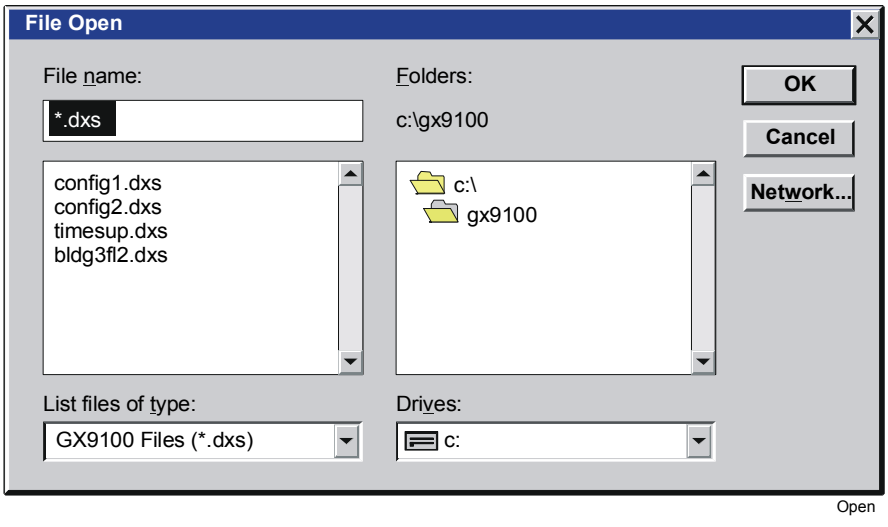


Figure 97: File Open Dialog Box

2. Select the configuration you want to modify from the File Name list.

   If the configuration you want does not appear in this list, you can search other directories by clicking on the folders in the Directories box, and you can access other drives by selecting them from the Drives drop-down list.

3. When you have selected the correct configuration file, click OK to open it.

Modifying Inputs and Outputs

Modifying Input/Output Configurations (AIs and DOs Only)

To change the configuration of analog inputs and digital outputs:

1. Click on the AI or DO with the right mouse button to bring up its pop-up menu.
2. Click on Delete. The following message box appears:

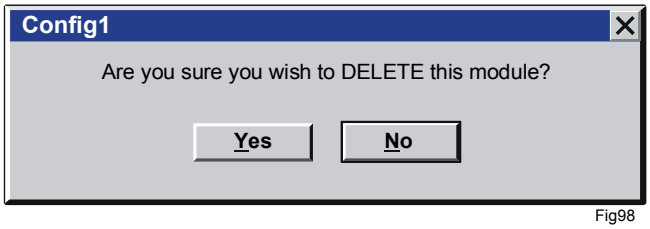


Figure 98: Delete Confirmation Dialog Box

3. Click Yes. This deletes the current input/output's configuration and removes its double border, but does not remove the AI or DO from the screen.
4. Click on the AI or DO with the right mouse button again to bring up its pop-up menu.
5. Click on the new input/output type. The input/output will be reconfigured as the new type, and the double border will appear.

Modifying Associated Data

To modify the data associated with inputs and outputs, follow the same procedure that you used to enter the data. Call up the data window, enter the new values in the data fields, and click OK to save the changes.

Deleting Modules

To delete a module:

1. Click on the module with the right mouse button to bring up its pop-up menu.
2. Click on Delete. The message box in Figure 98 appears.
3. Click on Yes to delete the selected module or No to cancel the operation.

Modifying Modules

Modifying Associated Data

To modify the data associated with modules, follow the same procedure that you used to enter the data. Call up the data window, enter the new values in the data fields, and click on OK to save the changes. To change the module type, delete the module and configure a new module.

Modifying PLC Modules

Modifying Associated Logic Variables

To modify the associated logic variables in a PLC module's ladder diagram:

1. Double-click on the PLC module block to open its ladder diagram.
2. Double-click in the middle of the instruction block to modify the associated logic variable. The intermediate menu for associated variables appear.
3. Choose a module from the intermediate menu and click OK. The list of that module's variables appear.
4. Choose a variable from the list and click OK. The program prompts you to confirm the change.
5. Click Yes to confirm the change. The new associated variable appears above the instruction block.

Modifying Instruction Blocks

To modify an instruction block:

1. Double-click on the PLC module block to open its ladder diagram.
2. Double-click the hot point of the instruction block you want to modify. A list of instructions appears.

   Note: Only instructions that do not affect the graphic representation of the ladder diagram can be changed. Other instructions may only be changed by erasing the PLC module (Edit--Clear) and re-entering the instructions.
3. Select a new instruction and click OK. The program prompts you to confirm the change.
4. Click Yes to confirm the change. The new instruction block appears in the diagram. Note that you have to re-assign an associated variable.

Clearing the Ladder Diagram

To clear the ladder diagram:

1. Double-click on the PLC module block to open its ladder diagram.
2. Select Clear from the Edit menu. The diagram is cleared.

Note: The program does not prompt to confirm the clear command. Make sure you want to clear the diagram before executing this command or all data in that diagram is lost. If clear is selected by mistake, the original diagram can be recovered by closing the PLC window without saving the changes and then reopening the window.

Modifying Module Numbers

Edit a module's number with the following procedure:

1. Click on the module with the right mouse button to bring up its pop-up menu.
2. Click on Change Module Number and the dialog box shown below appears.

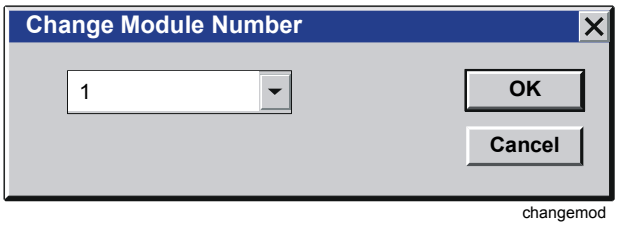


Figure 99: Change Module Number Dialog Box

3. Select the new module number in the list of available choices and click OK. The module appears with the new number.

Note: When modifying the module number of an XT or XTM with an attached EXP, both the XT/XTM and EXP numbers change. Also, the names of the associated inputs and outputs change.

Modifying Connections

Adding New Connections

To add new connections to an existing configuration, use the same procedure outlined in the *Connecting and Disconnecting Modules Creating a Configuration* section of this document.

Deleting Connections

To delete existing connections, use the same procedure outlined in the *Connecting and Disconnecting Modules Creating a Configuration* section of this document.

Changing Connections

To change existing connections, first disconnect the connection you want to change, then make the new connection. Use the same procedure outlined in the *Connecting and Disconnecting Modules Creating a Configuration* section of this document.

Calibrating Analog Inputs and Outputs

To calibrate analog inputs or outputs:

1. Upload the calibration values following the procedure in *Uploading a Configuration from the Controller* section of this document. Make sure you click on the radio button next to Calibration when you do the upload.

2. Select Calibration from the Edit menu. The following dialog box appears:

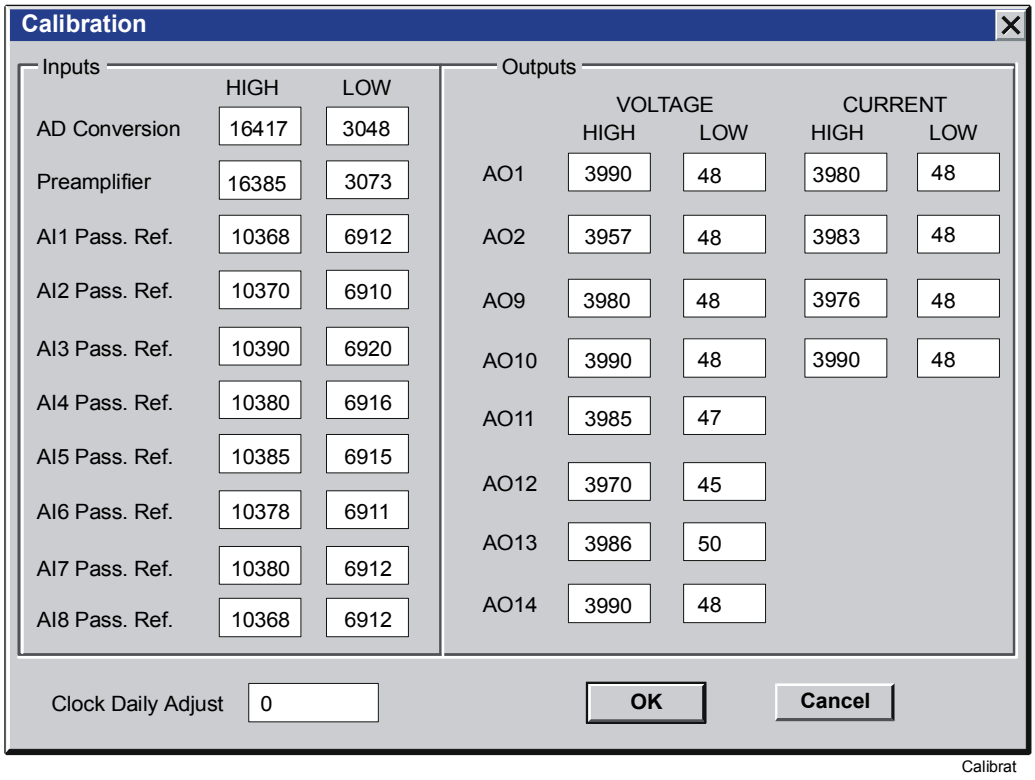


Figure 100: Calibration Dialog Box

3. Change the values in the edit fields to adjust the input or output.
4. Download the calibration values to the controller following the procedure in *Downloading to a DX Controller*. Make sure you select Calibration when you do the download.

   Note: If you want to save calibration data, you must create a file for each DX-9100 Controller as the calibration data for each controller will be different.

Configuring the DX LCD Display

Refer to the *GX-9100 for Windows Addendum–Configuring the DX LCD Display User's Guide* in *FAN 636.4* or *1628.4*.

Importing DOS GX-9100 Files

If you have existing DX-9100 Controllers that have been programmed using a previous (DOS) version of the GX-9100, use the Import feature in the File menu to convert them to this version.

1. Select Import from the File pull-down menu. The Import dialog box appears.

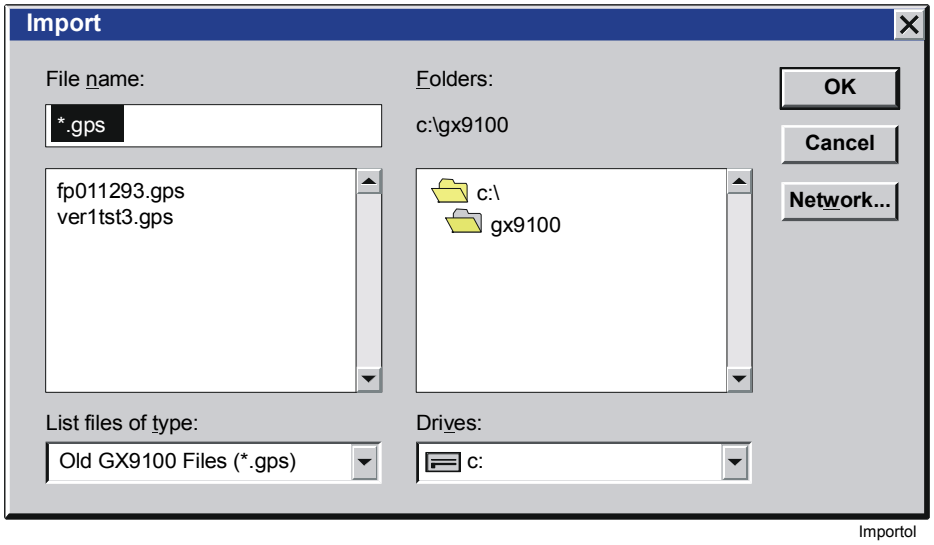


Figure 101: Import Dialog Box

2. Use standard Windows methods to select the proper drive, directory, and file to import.

   If you need to change the server, select the Network button. The Map Network Drive dialog box appears. If you need additional assistance concerning this screen, consult your network administrator.

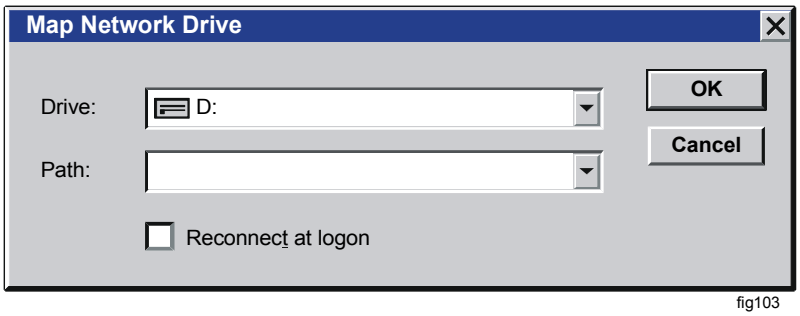


Figure 102: Map Network Drive Dialog Box

3. After highlighting the correct old file in the Import dialog box, select OK to convert it.

4. If there is an existing configuration already in the GX-9100, and it has been modified, the following dialog box appears. If it has already been saved, the line, `The changes are not saved!` does not appear.

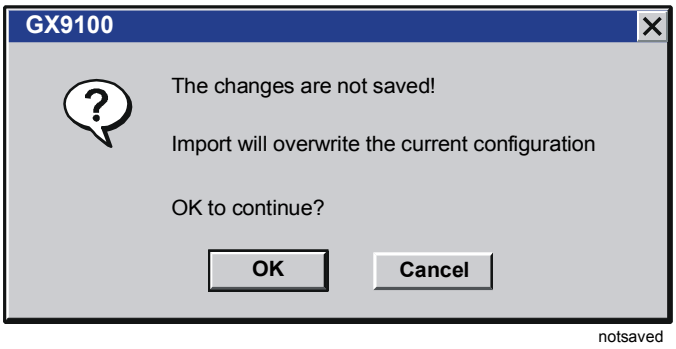


Figure 103: Changes Are Not Saved Dialog Box

5. If you select Cancel, the import procedure is aborted so you can save the existing job. If you select OK, the import process continues.
6. The file is converted into the updated format and loaded into GX-9100. When conversion is complete, the following dialog box appears:

Figure 104: Import Is Complete Dialog Box

7. Select OK. You can then modify the configuration, if necessary, and save it as a new .DXS file.

Commissioning

See the *DX Commissioning Using the Point Template Program User's Guide*, located in the *Programming and Commissioning* section of the *System 9100 Technical Manual (FAN 636.4* or *1628.4)* for detailed commissioning procedures. Among the procedures described in the document are:

- overriding, adjusting, and releasing points
- obtaining information for one or many controllers
- monitoring and graphing controller data
- customizing which points are displayed, their names, units, and how they are grouped
- using a Template File to build a DDL CS Model
- an example Template File, with explanations

Troubleshooting

Note on Ranges

When entering real numbers, the GX-9100 Software Configuration Tool for Windows accepts any value between -32750 and 32750. Numbers with a modulus greater than 2048 may be rounded up or down by up to 0.1 percent as shown in Table 17.

Table 17: Rounding Factors

Range	Rounding (+/-)
2049-4096	2
4097-8192	4
8193-16384	8
16385-32750	16

The rounding is due to the external communication bus protocol and does not compromise the precision of the internal control process.

Common Error Messages

The following are common error messages:

`The source and destination points do not match!`

- The source and destinations points are not of the same type (digital or analog). Choose a new source and/or destination point for this connection.

`The file could not be opened`

- The software could not find the file. Check whether the diskette is properly inserted in the diskette drive.
- The software could not open the file; the file could possibly be corrupted. Use the backup file instead.

Values entered in a data window are gone when you return.

- You may have exited the window by clicking Cancel or pressing the <Esc> key before saving changes. Make sure to click OK to save changes before exiting data windows.

A message appears when you exit a data window asking you to enter a number within a specific range; for example, `Please enter a number between 1 and 360.`

- When real and integer values are entered into a data window and you click OK, the GX-9100 tool checks the values before it saves the changes. If one of the values is outside of the allowed range, the program will display an error message defining the range of the point. When you click OK to close the error message, the value that needs to be changed will be highlighted. Change the value to one within the defined range and then click OK to exit the data window and save your changes.

Appendix 1: Source Points

ACOn	The current value of an *analog constant* set by a FMS, the GX Tool, SX Tool, or on the DX front panel.
AFB	A 1 when the DO PAT *associated feedback* value is not responding to changes in the DO PAT command value.
AIn	The current value of the *analog input.*
AI%n	The current value of the *analog input* in *percent* (%) of range.
AIHn	A 1 if the *analog input* is above its *high* limit and not below the high limit - limit differential.
AILn	A 1 if the *analog input* is below the *low* limit and not above the low limit + limit differential.
AOFn	A 1 when an *analog output* is being externally *forced.*
AOHn	A 1 when the *analog output* is equal to or above its *high* range.
AOLn	A 1 when the *analog output* is equal to or below its *low* range.
BATLOW	A 1 when the DX lithium battery needs to be replaced.
DCOn	The current value of a *digital constant* set by a FMS, the GX Tool, SX Tool, or on the DX front panel.
DIn	The current status of the *digital input*.
DIAL	When set to 1 by a set statement in the PLC, this causes the N2 *Dial*er to connect the N2 Bus to a FMS via telephone lines. The DIAL bit will be reset to 0 by the FMS when the telephone line connection is successful.
DICn	Toggles from 0 to 1 or 1 to 0 when the number of *digital input* transitions *(counts)* equals the prescaler.
DOn	The status of the *digital output*.
DOnC	A 1 when the FMS has commanded the *digital output* to be On.
DOnE	A 1 when the FMS has taken control of the *digital output*.
DOFn	A 1 when the *digital output* PAT or DAT is being externally *forced*.
DOHn	A 1 when the *digital output* PAT or DAT is at its defined *high* limit.

DOLn	A 1 when the *digital output* PAT or DAT is at its defined *low* limit.
HTRR	*Historical Trend Read Request*. A "1" when any **trend** log buffer has reached its Read Request limit.
LRSn	The *logic result status* of an OUT, OUTNOT, SET or RST statement in a PLC. (Refer to the PLC code to determine which number to use.)
NAIn	The analog numeric value that is received over the LONWORKS N2 Network.
NDIn-m	The digital value that is received over the LONWORKS N2 Network.
NAIUn	A 1 when the network analog shared value is no longer receiving data from the LONWORKS N2 Network.
NDIUn	A 1 when the network digital shared value is no longer receiving data from the LONWORKS N2 Network.
OSnHEAT	A 1 when *Optimal Start* module is in the *Heating* mode.
OSnOUT	A 1 when the *Optimal Start* module requires equipment to be On. It is the controlling *output* of an *Optimal Start* module to START/STOP heating or cooling equipment.
OSnPRE	A 1 while the *Optimal Start* module is in the *Pre-conditioning* mode (will turn Off at occupancy).
OSnSTO	A 1 when the *Optimal Start* module is in the *Optimal Stop* mode (will turn Off at vacancy - unoccupancy).
OUHn	A 1 when an analog or digital *output* is in *Hold* mode from either the DX front panel or FMS.
OULn	A 1 when the INC and DEC connections are both On in an analog output module (including PAT or DAT) and the *output* is *locked.*
OUTn	The value of the analog *output* (including PAT or DAT).
OVRn	A 1 when the value of the analog *input* is more than 5% above its normal range (overrange condition).
PMnCMH	A 1 when a control module's output is equal to its output *high* limit.
PMnCML	A 1 when a control module's output is equal to its output *low* limit.

PMnCMP A 1 when the control module's WSP is being overridden by a FMS (*Computer* mode).

PMnDISm A 1 when the output stage is *disabled* in a sequencer module.

PMnEF A 1 when this control module is being *externally forced.*

PMnFSSm A 1 when the totalized value of a totalization module is equal to the *full scale* limit of the channel.

PMnHDA A 1 when the difference PV - WSP is larger than the *high deviation alarm* value.

PMnHEAT A 1 when, in a symmetric control module, the PV is below the center of the symmetry band, and a 0 when above center; or a 1 when, in a dual control module, Loop 1 is active.

PMnHHDA A 1 when the difference PV - WSP is larger than the *high high deviation alarm* value.

PMnHLD A 1 when the program module is in the *Hold* mode, being overridden by the SX Tool or a FMS.

PMnHLDm A 1 when the channel of the program module has been overridden (in *hold*) from an SX service module or a FMS.

PMnLDA A 1 when the difference WSP - PV is larger than the *low deviation alarm* value.

PMnLLDA A 1 when the difference WSP - PV is larger than the *low low deviation alarm* value.

PMnLSm A 1 when the comparator module channel is at its comparison true *logic state*.

PMnLSP The value of the *local setpoint.* (This value is changed when adjusting the WSP from the DX front panel.)

PMnLSP1 The value of the *local setpoint* of Loop 1 of a dual control module. (This value is directly changed when adjusting the WSP1 from the DX front panel.)

PMnLSP2 The value of the *local setpoint* of Loop 2 of a dual control module. (This value is changed when adjusting the WSP2 from the DX front panel.)

PMnMCSm A 1 as long as the *maximum cycles status* timer for an output stage is active.

PMnMNWS The value of the *minimum working setpoint* allowed for a control module.

PMnMXWS The value of the *maximum working setpoint* allowed for a control module.

PMnNCM The calculation result of a *numeric module.*

PMnNCMm The calculation result of a channel of a *numeric module*.

PMnNMH A 1 when the calculated output is equal to or greater than the *numeric module high* limit.

PMnNMHm A 1 when the psychrometric *numeric module* output is equal to or greater than the *high* limit of the channel.

PMnNML A 1 when the calculated output is less than or equal to the *numeric module low* limit.

PMnNMLm A 1 when the psychrometric *numeric module* output is less than or equal to the *low* limit of the channel.

PMnOCM The value of the PID *control module output* in percent; either a 1 or 0 for an On/Off control module.

PMnOUT The analog value of the requested *output* load % (percent) of a sequencer.

PMnOUTD The *output difference* between the required load minus the sum of the loads of stages that are On in an Sequencer mode. This can be used for Vernier control.

PMnOUTS The analog value of the *output sum* of the loads of stages that are On in an sequencer module.

PMnSOF A 1 when this control module is in the *Shutoff* mode, which occurs when enable shutoff = 1 and the FMS has commanded it On.

PMnSTA A 1 when this control module is in the *Startup* mode, which occurs when enable startup = 1 and the FMS has commanded it On.

PMnSTOm A 1 when the *staged output* of a sequencer module is requested to be On.

PMnTDOm A 1 when the numeric *timer* channel output is On.

PMnTIMm The numeric *timer* module timer value of each channel. It will be 0 when the channel is not triggered or the timer has expired; or it will be the number of seconds (or minutes, or hours) left as the timer decrements.

PMnTOTm The *totalized* value of a totalization module channel; the number of events, runtime, or integration value.

PMnWSP The value of a control module *working setpoint*.

PMnWSP1 The value of the *working setpoint* of Loop 1 of a dual control module.

PMnWSP2 The value of the *working setpoint* of Loop 2 of a dual control module.

SLF A 0 when FMS is active, and returns to a 1 60 seconds after receiving the last command from the FMS.

SOFF A 1 when the FMS has commanded the *Shutoff* mode.

SSA A 1 when the FMS is *active*, and returns to 0 two hours after the last command from the FMS.

STUP A 1 when the FMS has commanded the *Startup* mode.

TSnEXS A 1 when a *time schedule* module has its *extension* enabled by a FMS or a DX front panel command.

TSnOUT A 1 when the real time is currently between the start and stop times of an event of the *time schedule* module and the current day is specified for that event.

UNRn A 1 when the value of the analog input is more than 5% below its normal range (underrange condition).

XTnAIm The current value of the *analog input* from the XT.

XTnAIHm A 1 if the *analog input* is above its *high* limit and not below the high limit - limit differential.

XTnAILm A 1 if the *analog input* is below the *low* limit and not above the low limit + limit differential.

XTnAOm The value of the analog *output* to the XT.

XTnCOM A 1 when the extension module is not communicating (wrong address, bus line broken, or bus line overload).

XTnDIm The current status of the *digital input* from the XT.

XTnDOn The status of the *digital output* to the XT.

XTnERR A 1 when the *expansion* module type does not match what was configured (i.e., configuring an XP-9102 and connecting an XP-9103 yields an *error*).

XTnHARD A 1 when the expansion module is not connected or not responding (hardware fault).

XTnOUHm A 1 when an analog or digital *output* is in *Hold* mode from either the DX front panel or FMS.

XTnPWR A 1 when the *extension* module detects a loss of *power* or loss of communication. The DX will reset this after a few seconds.

Appendix 2: Destination Points

ALD@ The connection to *disable* alarm processing on *analog inputs* AI1-AI8.

AO@ The numeric connection to control an *analog output*.

AOF@ The connection to *force* an *analog output* to a specified value.

DEC@ The connection to decrement an analog type output or sequencer module. While connection is a logic 1, the output will *decrease* at a rate dependent on the type of module.

DISn@ A connection in a sequencer to *disable* the corresponding stage or set number.

DO@ The connection to control a *digital output*.

DOF@ The connection for *forcing* a *digital output* to a specified value.

EF@ The connection to the *external forcing* point of control modules.

ENL@ The connection to *enable* output *limits* of an analog type output (PAT and DAT included).

FB@ The connection to the *feedback* of a PAT. Usually a signal from a potentiometer on the controlled device.

FST@ The connection to set the sequencer module into *fast step* down mode.

In@ *Analog input* connections to a programmable module.

INC@ The connection to increment an analog type output or sequencer module. While connection is a logic 1, the output will *increase* at a rate dependent on the type of module.

MNWS@ The connection to the *minimum working setpoint* of a control module. The WSP cannot be adjusted below this value.

MXWS@ The connection to the *maximum working setpoint* of a control module. The WSP cannot be adjusted above this value.

NAOn@ The numeric source of a Network Analog Output that is shared over the LONWORKS N2 Network.

NDOn-m@ The digital source of a Network Digital Output that is shared over the LONWORKS N2 Network.

OB@ The connection of an *output bias* value of a PID module.

OB1@ The connection for Loop 1 of a dual PID *output bias*.

OB2@ The connection for the Loop 2 of a dual PID *output bias.*

OF@ The connection to the *Off mode* source point of a control module.

OSnDA@ The connection to *disable* the *adaptive* action of an *Optimal Start/Stop* module.

OSnDI@ The connection to *disable* the *Optimal Start/Stop* module.

OSnOB@ The connection to the *Off Setpoint Bias*, which replaces the entered value when connected in an *Optimal Start/Stop* module.

OSnOT@ The connection for the *Outdoor Air Temperature* sensor of an *Optimal Start/Stop* module.

OSnSP@ The connection for the *Optimal Start* Zone Temperature *setpoint*. If connected, it replaces the entered setpoint.

OSnTS@ The connection in an *Optimal Start/Stop* module for the *time schedule* that determines when the building is occupied.

OSnZT@ The connection for the *Zone Temperature* sensor in an *Optimal Start/Stop* module.

PB@ The connection to *proportional band*, which replaces the value PB if there is a connection.

PV@ The connection to the *process variable* of a PID or an On/Off.

RA@ The connection to the *reverse action* point of a control module.

RHn@ The *relative humidity* sensor connections for psychrometric calculations.

RS@ The connection to a *remote setpoint*, which is used in the calculation for the working setpoint.

RSn@ The connection to the *reset* function of a totalization module channel (to reset to 0 and re-start) or timer module channel (to reset the output).

RS1@ The connection for Loop 1 of a dual PID or On/Off *remote setpoint*.

RS2@ The connection for Loop 2 of a dual PID or On/Off *remote setpoint*.

RV@ The connection to *reference variable* which is a multiplier in the calculation for the working setpoint.

RV1@ The connection for Loop 1 of a dual PID or On/Off *reference variable*.

RV2@ The connection for Loop 2 of a dual PID or On/Off *reference variable*.

SB@ The connection to the *stand by* source point of a control module.

SPn@ A *setpoint* connection for a comparator channel if a remote setpoint is desired, otherwise the entered value for the setpoint will be used.

TMn@ The *temperature* sensor connections for psychrometric calculations.

TSnOF@ A connection to externally force the output of a *time schedule* to Off.

TSnON@ A connection to externally force the output of a *time schedule* to On.

TSnEX@ A connection to the external extension *override* of a *time schedule*.

Appendix 3: Trend Log Items

Table 18 below lists the analog items and logic variables that can be defined in a Trend Log module for Metasys Point History. On the Metasys system, the analog inputs are mapped to AI objects, the analog outputs to AOS objects, and the logic variables to BI objects.

Table 19 lists the analog items and logic variables that can be defined in a Trend Log module for the DX LCD Display.

Note: Since a logic variable set is recorded when any one of its variables changes state, it is recommended that you assign LRS logic variable bytes to the trend log and then connect the source variables (the ones that you wish to trend) to the LRS variables in a PLC module.

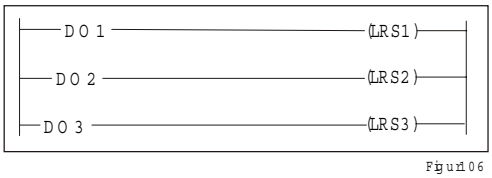


Figure 105: Example of Assigning LRS Logic Variable Bytes

Table 18: Trend Log Items for Metasys Point History

DX Version	Analog Items	Logic Variables
1.4, 2.4, and Later	AI1 to AI8 OUT1 to OUT8 ACO1 to ACO8	DI1..8 LRS1..8 LRS9..16 LRS17..24 LRS25..32
2.4 and Later Only	OUT9 to OUT14	–

Table 19: Trend Log Items for DX LCD Display

DX Version	Analog Items	Logic Variables
2.4, 3.4, and Later	AI1 to AI8 OUT1 to OUT14 ACO1 to ACO8 XTnAI1 to XTnAI8 XTnAO1 to XTnAO8 PMnK1 to PMnK34 PMnOU1 to PMnOU8 PMnAX1, PMnAX2	DI1..8 LRS1..8 LRS9..16 LRS17..24 LRS25..32 LRS33..40 LRS41..48 LRS49..56 LRS57..64 DO3..8 DCO1..8 DCO9..16 DCO17..24 DCO25..32 XTnDI1..8 XTnDO1..8 AIH1..4 AIH5..8 AIL1..4 AIL5..8 XTnAIH1..4 XTnAIH5..8 XTnAIL1..4 XTnAIL5..8 PMnDO1..8
3.4 and Later Only	NAI1 to NAI16	NDI1-1..8 NDI1-9..16 NDI2-1..8 NDI2-9..16 NDI3-1..8 NDI3-9..16 NDI4-1..8 NDI4-9..16 NDI5-1..8 NDI5-9..16 NDI6-1..8 NDI6-9..16 NDI7-1..8 NDI7-9..16 NDI8-1..8 NDI8-9..16

Appendix 4: DX LCD Display Data Points

Refer to the *GX-9100 for Windows Addendum–Configuring the DX LCD Display User's Guide* in *FAN 636.4* or *1628.4*.

Appendix 5: Item Abbreviations

4-SEGM	4 Channel Segment Module (4 break points each)
8-CALC	8 Channel Calculator Module
ACO	Analog Constant
AI	Analog Input
AO	Analog Output
AVERAGE	Average Calculation Module
BIN-SEQ	Binary Code Sequencer
CALC	Calculation Module
COMPRTR	Comparator
D-ONOFF	Dual On/Off
D-PID	Proportional, Integral and Derivative Controller (2 Loops)
DCO	Digital Constant
DI	Digital Input
DO	Digital Output
EXD	Exception Days
EXP	Expansion Module (XP2) for XT or XTM
LRS	Logic Result Status
MAXIMUM	Maximum Select Module
MINIMUM	Minimum Select Module
NAI	Network Analog Input
NAO	Network Analog Output
NDI	Network Digital Input
NDO	Network Digital Output
ONOFF	On/Off
OS	Optimal Start/Stop
PID	Proportional, Integral and Derivative Controller
PLC	Programmable Logic Controller
PM	Programmable Module

PSYCHRO	Psychrometric
SEGMENT	Segment Module (17 break points)
SELECT	4 Input Select Module
SEQ	Sequencer
STA/STO	Start/Stop
TIMER	8 Channel Time Module
TOTAL	Totalization
TS	Time Schedule Module
XT	XT-9100 Extension Module (includes XP1)
XTM	XTM-905 Extension Module (includes XP1) (XTM-905 is not available in North America as of May, 1999)

Appendix 6: Comparison with the DOS Version

Table 20: Comparison to the DOS Version

DOS Version Command	Windows Version Command (Menu Option and Keyboard Shortcut)	Toolbar Button or Mouse Action (where applicable)
INFO	Edit -- Job Information	
PRINT	File -- Print	
DOWNLD	Action -- Download	
UPLOAD	Action -- Upload	
SAVE	File -- Save	
READ	File -- Open	
NEW	File -- New	
CALIBR.	Edit -- Calibration	
REDRAW	(No equivalent command -- screen automatically refreshes.)	
VERSION	Controller -- DX Version 1.1, 1.2, 1.3 Controller -- DX Version 1.4 Controller -- DX Version 2.0, 2.1, 2.2 Controller -- DX Version 2.4 Controller -- DX Version 3.0, 3.1, 3.2 Controller -- DX Version 3.4	
GLOBAL	Edit -- Global data	
QUIT	File -- Exit	
SOURCE	Edit – Connect, or F5 key	Click and drag the bent arrow from the source point to the destination point.
DATA	Edit -- data	
DELETE	Edit -- Delete	
CONN	View -- Show Connections	

Appendix 7: Custom Home Page Syntax

Refer to the *GX-9100 for Windows Addendum–Configuring the DX LCD Display User's Guide* in *FAN 636.4* or *1628.4*.

Notes

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